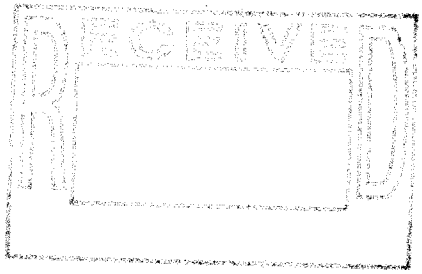
NOTICE

All drawings located at the end of the document.

Closeout Report
for IHSS Group 500-2

IHSS 500-158 Radioactive Site - Building 551

Approval received from the Colorado Department of Public Health and Environment
June 18, 2004.
Approval letter contained in the Administrative Record.



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ACRONYMS

AAESE	Accelerated Action Ecological Screening Process
AL	action level
AR	Administrative Record
ASD	Analytical Services Division
BMP	best management practice
CAD/ROD	Corrective Action Decision/Record of Decision
CAS	Chemical Abstracts Service
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHWA	Colorado Hazardous Waste Act
CMS/FS	Corrective Measures Study/Feasibility Study
COC	contaminant of concern
cpm	counts per minute
CRA	Comprehensive Risk Assessment
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation
ft	foot
ft^2	square foot
FY	Fiscal Year
HPGe	high-purity germanium
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remediation Action
K-H	Kaiser-Hill Company, L.L.C.
LCS	laboratory control sample
µg/kg	micrograms per kilogram (may be found as ug/kg)
µg/L	micrograms per liter (may be found as ug/L)
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NFAA	No Further Accelerated Action
NLR	No Longer Representative
OPWL	Original Process Waste Line
PAH	polyaromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocuries per gram
PCOC	potential contaminant of concern
POE	Point of Evaluation
QC	quality control
RAO	remedial action objective

RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS or Site	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RIN	report identification number
RISS	Remediation, Industrial Decommissioning and Demolition, and Site Services
RL	reporting limit
RPD	relative percent difference
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
SOR	sum of ratios
SSRS	Subsurface Soil Risk Screen
SWD	Soil Water Database
V&V	verification and validation
VOC	volatile organic compound
WRW	wildlife refuge worker

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EXECUTIVE SUMMARY

This Closeout Report summarizes accelerated action activities conducted at Individual Hazardous Substance Site (IHSS) Group 500-2 – IHSS 500-158 Radioactive Site - Building 551. Activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001), IASAP Addendum #IA-03-07 (DOE 2003a), and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2003b). Notification of the planned characterization and removal activities was provided in ER RSOP Notification #04-14 (DOE 2004).

Accelerated action activities were conducted between March 1 and May 6, 2004, and included soil characterization and removal activities. Characterization analytical results indicate that one isolated occurrence of chromium exceeded the corresponding wildlife refuge worker (WRW) action level (AL). The contaminated soil was removed. Results of the Data Quality Assessment (DQA) confirm that the data collected and used are adequate for decision making.

Removal activities were consistent with and contributed to the ER RSOP overall long-term remedial action objectives (RAOs) for Rocky Flats Environmental Technology Site (RFETS or Site) soil. The removal of contaminated soil contributed to the protection of human health and the environment, because potential sources of contamination were removed. These actions also minimized the need for long-term maintenance and institutional or engineering controls. In addition, best management practices (BMPs) were used to prevent the spread of contamination (for example, erosion and dust controls).

The Subsurface Soil Risk Screen (SSRS) and stewardship evaluation conducted as part of this accelerated action indicate that No Further Accelerated Action (NFAA) is warranted. This IHSS is not located within an area considered to be subject to high erosion and landslides in accordance with Figure 1 of Attachment 5 of the RFCA Modification (DOE et al. 2003). Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process. Access will be restricted to limit disturbance. Site access and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls.

The presence of radionuclides, metals, and volatile organic compounds (VOCs) in soil will be evaluated in the Comprehensive Risk Assessment (CRA), which is part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility Study (CMS/FS) that will be conducted for the Site. The need for and extent of any more general, long-term stewardship activities will also be evaluated in the RFI/RI and CMS/FS and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision (CAD/ROD), any post-closure Colorado Hazardous Waste Act (CHWA) permit that may be required, and any post-RFCA agreement.

No long-term stewardship activities are recommended for IHSS 500-158 beyond the generally applicable Site requirements that may be imposed on this area in the future. After the current use of the area as a source for fill ceases in the short term, institutional controls will be used as

appropriate for this area, including prohibitions on building construction, restrictions on excavation or other soil disturbance, and prohibitions on groundwater pumping in the area of IHSS 500-158.

This Closeout Report and associated documentation will be retained as part of the Rocky Flats Administrative Record (AR) file. The specific long-term stewardship recommendations will also be summarized in the Rocky Flats Long-Term Stewardship Strategy.

Approval of this Closeout Report constitutes regulatory agency concurrence that this IHSS Group is an NFAA Site. An NFAA decision is justified based on the following:

- Soil with chromium concentrations greater than the WRW AL was removed.
- All remaining contaminant concentrations are less than WRW ALs.
- No accelerated action is required, based on the SSRS.
- No accelerated action is required, based on the stewardship evaluation.

This information and the NFAA determination will be documented in the Fiscal Year (FY) 2004 (04) Historical Release Report (HRR).

1.0 INTRODUCTION

This Closeout Report summarizes accelerated action activities conducted at Individual Hazardous Substance Site (IHSS) 500-158, which constitutes IHSS Group 500-2 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. The general location of IHSS Group 500-2 at the Site is shown on Figure 1, and a more detailed location for IHSS Group 500-2 is presented on Figure 2.

Other IHSS Groups adjacent to IHSS Group 500-2 include (Figure 2) IHSS Groups 500-1 and 500-4. IHSS Group 500-1 consists of IHSS 300-186 (Valve vaults 11, 12, and 13), IHSS 500-197 (Scrap Metal Storage Site), and IHSS 500-117.1 (North Side Chemical Storage Site). IHSS Group 500-1 is currently being sampled for characterization. IHSS 500-4 consists of IHSS 500-117.2 (Middle Site Chemical Storage). IHSS Group 500-4 has been characterized and is being closed out via a Data Summary Report being written concurrently with this IHSS Group 500-2 Closeout Report.

Accelerated action activities at IHSS Group 500-2 were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001), IASAP Addendum #IA-03-07 (DOE 2003a), and the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) Modification 1 (DOE 2003b). Notification of the planned activities was provided in ER RSOP Notification #04-14 (DOE 2004), which was approved by the Colorado Department of Public Health and Environment (CDPHE) on April 12, 2004 (CDPHE 2004).

This report contains the information necessary to demonstrate attainment of cleanup objectives and final closure of IHSS 500-158, including:

- Site characterization information
  - Description of site characterization activities, and
  - Site characterization data, including data tables and maps;
- Site accelerated action information;
- Description of the accelerated action, including the rationale for the action and map of the target remediation area;
- Map of the project area (Figure 2) and dates and durations of specific remedial activities;
- Photographs documenting site characterization, remediation, and reclamation activities;
- Accelerated action characterization and confirmation sampling data, including data tables and location maps, as well as a comparison of the characterization data to applicable cleanup goals;
- Description of deviations from the ER RSOP (DOE 2003b);
- Description of the Subsurface Soil Risk Screen (SSRS);
- Description of near-term stewardship actions and long-term stewardship recommendations;
- Disposition of wastes;

- Site reclamation;
- Table of No Longer Representative (NLR) locations and sample numbers that have been remediated. These data will be used to mark database records so they are not used in the Comprehensive Risk Assessment (CRA) or other Site analyses; and
- The Data Quality Assessment (DQA), including comparison of accelerated action data with project data quality objectives (DQOs).

Approval of this Closeout Report constitutes regulatory agency concurrence that this IHSS Group is a No Further Accelerated Action (NFAA) Site. This information and NFAA determination will be documented in the Fiscal Year (FY) 2004 (04) Annual Update for the Historical Release Report (HRR).

2.0 SITE CHARACTERIZATION

Characterization information on IHSS Group 500-2 consists of limited historical knowledge and recent historical analytical data. Historical information for the IHSS is briefly summarized in Section 2.1. Historical analytical data associated with IHSS 500-158 can be found in the RFETS IA Data Summary Report (DOE 2000) and IASAP Addendum #IA-03-07 (DOE 2003a). Additional historical information on IHSS 500-158 is available from the HRRs (DOE 1992-2003) and IASAP (DOE 2001). Accelerated action data are summarized in Section 2.2.

Sampling specifications, including potential contaminants of concern (PCOCs) and media sampled, are presented in Table 1. Deviations from the IASAP Addendum and confirmation samples are also presented and explained in Table 1. The actual sampling and analysis summary, including confirmation sampling, is presented in Table 2. In Table 2 the number of sampling locations increased because of the addition of four confirmation locations. The number of intervals and radionuclide and metal samples increased because of additional sampling requirements imposed by the Contact Record of February 19, 2004 (Appendix A). The number of volatile organic compound (VOC) samples decreased because of requirements imposed by the Contact Records of February 19 and March 16, 2004 (Appendix A).

A compact disc that contains a complete accelerated action data set, as of June 10, 2004, is enclosed. The disc has two files containing real and quality control (QC) data for the project. These files contain standardized data. Chemical Abstracts Service (CAS) numbers, analyte names, and units have been standardized, and plutonium and uranium activities calculated from high-purity germanium (HPGe) or alpha spectrometry analyses have been added.

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Table 1
IHSS Group 500-2 – IHSS 500-158 Accelerated Action Characterization Specifications and Deviations

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ40-003	2082667.624	749560.344	2082667.624	749560.344	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
BZ40-003	2082667.624	749560.344	2082667.624	749560.344	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
BZ40-007	2082711.552	749549.746	2082711.552	749549.746	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, SAP Addendum amended: "A" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04 (Appendix A), no significant difference in location
BZ40-007	2082711.552	749549.746	2082711.552	749549.746	Subsurface soil	0.5-1.5	Radionuclides Metals	Statistical, SAP Addendum amended: "B" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04, no recovery at 1.5-2.5 ft, no significant difference in location
BZ40-007	2082711.552	749549.746	2082711.552	749549.746	Subsurface soil	5.5-7.5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: interval collected in native soil (top at 5.5 ft) for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no significant difference in location
BZ40-007	2082711.552	749549.746	2082711.552	749549.746	Subsurface soil	7.5-9.2	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: interval collected in native soil for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no recovery at 9.2-9.5 ft, no significant difference in location
BZ41-006	2082671.968	749760.737	2082671.968	749760.737	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record – 3/16/04, no significant difference in location or interval
BZ41-006	2082671.968	749760.737	2082671.968	749760.737	Subsurface soil	0.5-2.0	Radionuclides Metals VOCs	Statistical, no recovery at 2.0-2.5 ft, no significant difference in location
BZ41-007	2082676.796	749725.062	2082676.796	749725.062	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record - 3/16/04, no significant difference in location or interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ41-007	2082676.796	749725.062	2082676.796	749725.062	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Statistical, no recovery at 1.5-2.5 ft, no significant difference in location
BZ41-008	2082681.623	749689.387	2082681.623	749689.387	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record - 3/16/04, no significant difference in location or interval
BZ41-008	2082681.623	749689.387	2082681.623	749689.387	Subsurface soil	0.5-2.0	Radionuclides Metals VOCs	Statistical, no recovery at 2.0-2.5 ft, no significant difference in location
BZ41-009	2082686.451	749653.712	2082686.451	749653.712	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record - 3/16/04, no significant difference in location or interval
BZ41-009	2082686.451	749653.712	2082686.451	749653.712	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Statistical, no recovery at 1.5-2.5 ft, no significant difference in location
BZ41-010	2082691.278	749618.037	2082691.278	749618.037	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
BZ41-010	2082691.278	749618.037	2082691.278	749618.037	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
BZ41-011	2082696.105	749582.362	2082696.105	749582.362	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
BZ41-011	2082696.105	749582.362	2082696.105	749582.362	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
BZ41-023	2082727.867	749614.729	2082727.867	749614.729				Statistical, SAP Addendum amended: "A " interval not collected, Contact Record - 2/19/04
BZ41-023	2082727.867	749614.729	2082727.867	749614.729				Statistical, SAP Addendum amended: "B" interval not collected, Contact Record - 2/19/04
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	2.5-4.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling begins in fill at 2.5 ft in "C "interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	4.5-6.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling continues in fill at 4.5 ft in "D" interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	6.8-7.3	Radionuclides Metals	Statistical, SAP Addendum amended: sampling continues in fill at 6.5 ft in "E" interval for radionuclides and metals, Contact Record - 2/19/04, no recovery at 6.5-6.8 and 7.3-8.5 ft, no significant difference in location
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	8.5-10.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling continues in fill at 8.5 ft in "F" interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	10.5-12.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling continues in fill at 10.5 ft in "G" interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	12.5-14.5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: sampling begins in native soil (top at 12.5 ft) in "H" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no significant difference in location
BZ41-023	2082727.867	749614.729	2082727.867	749614.729	Subsurface soil	14.5-16.5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: sampling continues in native soil at 14.5 ft in "I" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no significant difference in location
BZ42-001-01	2082724.104	749840.448	2082724.104	749840.448	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication, no significant difference in location or interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
BZ42-001-01	2082724.104	749840.448	2082724.104	749840.448	Subsurface soil	0.5-2.0	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of location code duplication, no recovery at 2.0-2.5 ft, no significant difference in location
BZ42-002-01	2082728.932	749804.773	2082728.932	749804.773	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication, no significant difference in location or interval
BZ42-002-01	2082728.932	749804.773	2082728.932	749804.773	Subsurface soil	0.5-1.0	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of location code duplication, no significant difference in location or interval
BZ42-003-01	2082733.759	749769.098	2082733.759	749769.098	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication, no significant difference in location or interval
BZ42-003-01	2082733.759	749769.098	2082733.759	749769.098	Subsurface soil	0.5-1.0	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of location code duplication, no recovery at 1.0-2.5 ft, no significant difference in location
BZ42-005-01	2082695.623	749818.430	2082695.623	749818.430	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, location code amended with "-01" because of location code duplication, no significant difference in location or interval
BZ42-005-01	2082695.623	749818.430	2082695.623	749818.430	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, location code amended with "-01" because of sample number duplication, no significant difference in location or interval
BZ42-009	2082667.141	749796.412	2082667.141	749796.412	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
BZ42-009	2082667.141	749796.412	2082667.141	749796.412	Subsurface soil	0.5-2.0	Radionuclides Metals VOCs	Statistical, no recovery at 2.0-2.5 ft, no significant difference in location
CA40-014	2082857.823	749549.753	2082857.823	749549.753	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA40-014	2082857.823	749549.753	2082857.823	749549.753	Subsurface soil	0.5-1.1	Radionuclides Metals VOCs	Statistical, no recovery at 1.1-3.0 ft, no significant difference in location
CA41-017	2082862.168	749750.146	2082862.126	749750.135	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-017	2082862.168	749750.146	2082862.126	749750.135	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Statistical, no recovery at 1.5-2.5 ft, no significant difference in location
CA41-018	2082866.995	749714.471	2082867.002	749714.453	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-018	2082866.995	749714.471	2082867.002	749714.453	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Statistical, no recovery at 1.5-2.5 ft, no significant difference in location
CA41-019	2082871.823	749678.796	2082871.823	749678.796	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-019	2082871.823	749678.796	2082871.823	749678.796	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-020	2082876.650	749643.121	2082876.650	749643.121	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-020	2082876.650	749643.121	2082876.650	749643.121	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-023	2082833.686	749728.128	2082833.683	749728.105	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-023	2082833.686	749728.128	2082833.683	749728.105	Subsurface soil	0.5-1.2	Radionuclides Metals VOCs	Statistical, no recovery at 1.2-2.5 ft, no significant difference in location
CA41-024	2082838.514	749692.453	2082838.514	749692.453	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-024	2082838.514	749692.453	2082838.514	749692.453	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-025	2082843.341	749656.778	2082843.341	749656.778	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-025	2082843.341	749656.778	2082843.341	749656.778	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-026	2082848.168	749621.103	2082848.168	749621.103	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-026	2082848.168	749621.103	2082848.168	749621.103	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-027	2082852.996	749585.428	2082852.996	749585.428	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-027	2082852.996	749585.428	2082852.996	749585.428	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-028	2082800.377	749741.784	2082800.368	749741.815	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-028	2082800.377	749741.784	2082800.368	749741.815	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Statistical, no recovery at 1.5-2.5 ft, no significant difference in location
CA41-029	2082805.205	749706.110	2082805.176	749706.161	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-029	2082805.205	749706.110	2082805.176	749706.161	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-031	2082814.859	749634.760	2082814.859	749634.760	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, VOCs canceled, Contact Record – 3/16/04, no significant difference in location or interval
CA41-031	2082814.859	749634.760	2082814.859	749634.760	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-032	2082819.687	749599.085	2082819.687	749599.085	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-032	2082819.687	749599.085	2082819.687	749599.085	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-033	2082824.514	749563.410	2082824.514	749563.410	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-033	2082824.514	749563.410	2082824.514	749563.410	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-034	2082767.068	749755.441	2082767.068	749755.441	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA41-034	2082767.068	749755.441	2082767.068	749755.441	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-047	2082760.496	749744.696	2082760.496	749744.696	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-047	2082760.496	749744.696	2082760.496	749744.696	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-048	2082744.181	749679.713	2082744.181	749679.713	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, SAP Addendum amended: "A" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
CA41-048	2082744.181	749679.713	2082744.181	749679.713	Subsurface soil	0.5-2.5	Radionuclides Metals	Statistical, SAP Addendum amended: "B" interval collected in fill for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
CA41-048	2082744.181	749679.713	2082744.181	749679.713	Subsurface soil	9.0-10.8	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: interval collected in native soil (top at 9 ft) for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no recovery at 10.8-12.0 ft, no significant difference in location
CA41-048	2082744.181	749679.713	2082744.181	749679.713	Subsurface soil	12.0-14.0	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: interval collected in native soil for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no significant difference in location
CA41-049	2082792.301	749633.092	2082792.301	749633.092	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-049	2082792.301	749633.092	2082792.301	749633.092	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA41-050	2082775.987	749568.109	2082775.987	749568.109				Statistical, SAP Addendum amended: "A" interval not collected, Contact Record - 2/19/04
CA41-050	2082775.987	749568.109	2082775.987	749568.109				Statistical, SAP Addendum amended: "B" interval not collected, Contact Record - 2/19/04
CA41-050	2082775.987	749568.109	2082775.987	749568.109	Subsurface soil	2.5-4.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling begins in fill at 2.5 ft in "C" interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA41-050	2082775.987	749568.109	2082775.987	749568.109	Subsurface soil	4.5-6.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling continues in fill at 4.5 ft in "D" interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
CA41-050	2082775.987	749568.109	2082775.987	749568.109	Subsurface soil	6.5-8.5	Radionuclides Metals	Statistical, SAP Addendum amended: sampling continues in fill at 6.5 ft in "E" interval for radionuclides and metals, Contact Record - 2/19/04, no significant difference in location
CA41-050	2082775.987	749568.109	2082775.987	749568.109	Subsurface soil	8.5-10.5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: sampling begins in native soil (top at 8.5 ft) in "F" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no significant difference in location
CA41-050	2082775.987	749568.109	2082775.987	749568.109	Subsurface soil	10.5-12.5	Radionuclides Metals VOCs	Statistical, SAP Addendum amended: sampling continues in native soil in "G" interval for radionuclides, metals, and VOCs, Contact Record - 2/19/04, no significant difference in location
CA41-051			2082842.811	749659.516	Surface soil	0.0-0.5	Metals	Biased confirmation sample collected from northern excavation wall, no significant difference in interval
CA41-052			2082845.420	749657.051	Surface soil	0.0-0.5	Metals	Biased confirmation sample collected from eastern excavation wall, no significant difference in interval
CA41-053			2082843.459	749655.036	Surface soil	0.0-0.5	Metals	Biased confirmation sample collected from southern excavation wall, no significant difference in interval
CA41-054			2082840.400	749657.150	Surface soil	0.0-0.5	Metals	Biased confirmation sample collected from western excavation wall, no significant difference in interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA42-015	2082852.513	749821.495	2082847.267	749821.052	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, relocated 5 ft west because of water main, no significant difference in interval
CA42-015	2082852.513	749821.495	2082847.267	749821.052	Subsurface soil	0.5-1.6	Radionuclides Metals VOCs	Statistical, relocated 5 ft west because of water main, no recovery at 1.6-2.5 ft
CA42-016	2082857.341	749785.821	2082846.729	749787.208	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, relocated 10 ft west because of water main, no significant difference in interval
CA42-016	2082857.341	749785.821	2082846.729	749787.208	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, relocated 10 ft west because of water main, no significant difference in interval
CA42-019	2082824.031	749799.477	2082824.038	749799.503	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA42-019	2082824.031	749799.477	2082824.038	749799.503	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA42-020	2082828.859	749763.802	2082828.319	749770.177	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, relocated 7 ft north because of water main, no significant difference in interval
CA42-020	2082828.859	749763.802	2082828.319	749770.177	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Statistical, relocated 7 ft north because of water main, no recovery at 1.5-2.5 ft
CA42-024	2082795.550	749777.459	2082795.520	749777.448	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA42-024	2082795.550	749777.459	2082795.520	749777.448	Subsurface soil	0.5-1.8	Radionuclides Metals VOCs	Statistical, no recovery at 1.8-2.5 ft, no significant difference in location
CA42-026	2082757.413	749826.791	2082757.413	749826.791	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA42-026	2082757.413	749826.791	2082757.413	749826.791	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA42-027	2082762.241	749791.116	2082762.241	749791.116	Surface soil	0.0-0.5	Radionuclides Metals	Statistical, no significant difference in location or interval
CA42-027	2082762.241	749791.116	2082762.241	749791.116	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Statistical, no significant difference in location or interval
CA42-030	2082876.151	749823.087	2082876.151	749823.087	Surface soil	0.0-0.5	Radionuclides Metals	Biased, sampled former retention pond, no significant difference in location or interval

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA42-030	2082876.151	749823.087	2082876.151	749823.087	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-030	2082876.151	749823.087	2082876.151	749823.087	Subsurface soil	2.5-4.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-030	2082876.151	749823.087	2082876.151	749823.087	Subsurface soil	4.5-6.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-030	2082876.151	749823.087	2082876.151	749823.087	Subsurface soil	6.5-8.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-030	2082876.151	749823.087	2082876.151	749823.087	Subsurface soil	8.5-10.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-031	2082872.467	749814.982	2082872.539	749815.003	Surface soil	0.0-0.5	Radionuclides Metals	Biased, sampled former retention pond, no significant difference in location or interval
CA42-031	2082872.467	749814.982	2082872.539	749815.003	Subsurface soil	0.5-1.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no recovery at 1.5-2.5 ft, no significant difference in location
CA42-031	2082872.467	749814.982	2082872.539	749815.003	Subsurface soil	2.5-4.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-031	2082872.467	749814.982	2082872.539	749815.003	Subsurface soil	4.5-6.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-031	2082872.467	749814.982	2082872.539	749815.003	Subsurface soil	6.5-8.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no significant difference in location or interval
CA42-031	2082872.467	749814.982	2082872.539	749815.003	Subsurface soil	8.5-9.5	Radionuclides Metals VOCs	Biased, sampled former retention pond, no recovery at 9.5-10.5 ft, no significant difference in location
CA42-032	2082797.716	749804.961	2082797.693	749804.988	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Biased, sampled southern loading dock at Building 553, no significant difference in location or interval
CA42-032	2082797.716	749804.961	2082797.693	749804.988	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Biased, sampled southern loading dock at Building 553, "B" interval added for VOCs, Contact Record - 3/16/04, radionuclides and metals extra, no significant difference in location

Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Actual Media	Actual Depth Interval (ft)	Actual Analytes	Comments/Deviations
CA42-032	2082797.716	749804.961	2082797.693	749804.988	Subsurface soil	2.5-4.5	Radionuclides Metals VOCs	Biased, sampled southern loading dock at Building 553, no significant difference in location or interval
CA42-033	2082797.316	749845.369	2082797.316	749845.369	Surface soil	0.0-0.5	Radionuclides Metals VOCs	Biased, sampled northern loading dock at Building 553, no significant difference in location or interval
CA42-033	2082797.316	749845.369	2082797.316	749845.369	Subsurface soil	0.5-2.5	Radionuclides Metals VOCs	Biased, sampled northern loading dock at Building 553, "B" interval added for VOCs, Contact Record - 3/16/04, radionuclides and metals extra, no significant difference in location
CA42-033	2082797.316	749845.369	2082797.316	749845.369	Subsurface soil	2.5-4.5	Radionuclides Metals VOCs	Biased, sampled northern loading dock at Building 553, no significant difference in location or interval

VOC = volatile organic compound ft = foot

Table 2
IHSS Group 500-2 Accelerated Action and Confirmation Sampling and Analysis Summary

Criteria	IASAP Addendum	Actual
Number of Sampling Locations	45	49
Number of Samples	98	116
Number of Radionuclide Samples	98	116
Number of Metal Samples	98	116
Number of VOC Samples	69	66

2.1 Historical Information

Building 551 was located within the IA on the northern side of Central Avenue (Figure 2). The original building footprint was approximately 21,600 square feet (ft^2). Building 551 was placed in service in 1953 as the Plant warehouse. An addition to the northern portion of the building was constructed in the mid-1960s, and was used as a sheet metal fabrication shop. An area northeast of the original Building 551 was used as a general warehouse storage yard prior to September 1959 until the early 1970s.

Several radioactive releases or incidents at or near the original Building 551 were reported in the HRRs (1992-2003). Construction of the northern addition to Building 551 covered some of these potential release sites. In September 1959, activities measuring up to 40,000 counts per minute (cpm) were discovered north of Building 551 due to releases from waste boxes being loaded onto rail cars.

In 1961, isolated areas of contamination with activities up to 8,000 cpm were encountered on the loading dock and helium storage area of Building 553. Contaminated drums with activities up to 1,200 cpm on the exterior surfaces and up to 7,000 cpm on the interior surfaces were received at Building 551 in 1962. Other incidents that occurred in 1963 and 1970 involve radioactive-contaminated equipment and drums that were received at Building 551.

Preaccelerated action soil sampling results at IHSS Group 500-2 IHSS 500-158 indicated that all PCOC concentrations were less than wildlife refuge worker (WRW) action levels (ALs) (DOE 2003a).

2.2 Accelerated Action Characterization Data

Accelerated action characterization soil sampling locations and analytical results for IHSS 500-158 are presented on Figures 3 and 4 and in Table 3. Figure 3 presents surface and subsurface soil results for the northern half of IHSS 500-158, and Figure 4 presents surface and subsurface soil results for the southern half of IHSS 500-158. Only results greater than background means plus two standard deviations or reporting limits (RLs) are shown. Results indicate one surface soil sampling location, CA41-025, where chromium (2,600 milligrams per kilogram [mg/kg]) exceeded the RFCA WRW AL of 268 mg/kg. The remaining contaminant concentrations were below RFCA WRW ALs.

Biased locations CA42-030 and CA42-031 were selected in SAP Addendum #IA-03-07 (DOE 2003a) to investigate a former retention pond northeast of Building 551 (Figure 3).

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(Ref: 04-RF-00797; KLW-004-04)

Closeout Report for IHSS Group 500-2
IHSS 500-158 Radioactive Site – Building 551

June 2004

Figure 3:

IHSS Group 500-2 Accelerated Action Surface and Subsurface Soil Sampling Results Greater than Background Means Plus Two Standard Deviations or Reporting Limits (Northern Half)

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June 16, 2004

CERCLA Administrative Record Document, IA-A-002242

U.S. DEPARTEMENT OF ENERGY
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GOLDEN, COLORADO

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Closeout Report for IHSS Group 500-2
IHSS 500-158 Radioactive Site – Building 551

June 2004

Figure 4:

IHSS Group 500-2 Accelerated Action Surface and Subsurface Soil Sampling Results Greater than Background Means Plus Two Standard Deviations or Reporting Limits (Southern Half)

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June 16, 2004

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Table 3
IHSS Group 500-2 - IHSS 500-158 Accelerated Action Characterization Data
Greater Than Background Means Plus Two Standard Deviations or Reporting Limits

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
BZ40-003	2082667.624	749560.344	Chromium	18.000	NA	268.0	16.990	mg/kg	0	0.5
BZ40-003	2082667.624	749560.344	Copper	22.000	NA	40900.0	18.060	mg/kg	0	0.5
BZ40-003	2082667.624	749560.344	Zinc	180.000	NA	307000.0	73.760	mg/kg	0	0.5
BZ40-003	2082667.624	749560.344	Naphthalene	7.650	6.990	3090000.0	NA	µg/kg	0.5	2.5
BZ40-003	2082667.624	749560.344	Uranium-235	0.175	NA	8.0	0.120	pCi/g	0.5	2.5
BZ40-003	2082667.624	749560.344	Uranium-238	2.415	NA	351.0	1.490	pCi/g	0.5	2.5
BZ40-007	2082711.552	749549.746	Aluminum	18000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ40-007	2082711.552	749549.746	Arsenic	15.000	NA	22.2	13.140	mg/kg	5.5	7.5
BZ41-006	2082671.968	749760.737	Aluminum	21000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ41-006	2082671.968	749760.737	Chromium	17.000	NA	268.0	16.990	mg/kg	0	0.5
BZ41-006	2082671.968	749760.737	Lithium	12.000	NA	20400.0	11.550	mg/kg	0	0.5
BZ41-006	2082671.968	749760.737	Nickel	15.000	NA	20400.0	14.910	mg/kg	0	0.5
BZ41-006	2082671.968	749760.737	Uranium-235	0.164	NA	8.0	0.094	pCi/g	0	0.5
BZ41-006	2082671.968	749760.737	Lead	25.000	NA	1000.0	24.970	mg/kg	0.5	2
BZ41-006	*2082671.968*	*749760.737*	*Uranium-234*	*3.132*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2*
BZ41-006	2082671.968	749760.737	Uranium-235	0.237	NA	8.0	0.120	pCi/g	0.5	2
BZ41-006	2082671.968	749760.737	Uranium-238	3.132	NA	351.0	1.490	pCi/g	0.5	2
BZ41-007	2082676.796	749725.062	Plutonium-239/240	0.106	NA	50.0	0.066	pCi/g	0	0.5
BZ41-007	2082676.796	749725.062	Zinc	110.000	NA	307000.0	73.760	mg/kg	0	0.5
BZ41-007	2082676.796	749725.062	Lead	32.000	NA	1000.0	24.970	mg/kg	0.5	1.5
BZ41-007	2082676.796	749725.062	Tetrachloroethene	1.300	1.100	615000.0	NA	µg/kg	0.5	1.5
BZ41-008	2082681.623	749689.387	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ41-008	2082681.623	749689.387	Antimony	1.900	NA	409.0	0.470	mg/kg	0	0.5
BZ41-008	2082681.623	749689.387	Cadmium	3.300	NA	962.0	1.612	mg/kg	0	0.5
BZ41-008	2082681.623	749689.387	Chromium	19.000	NA	268.0	16.990	mg/kg	0	0.5
BZ41-008	2082681.623	749689.387	Copper	19.000	NA	40900.0	18.060	mg/kg	0	0.5
BZ41-008	2082681.623	749689.387	Lead	73.000	NA	1000.0	54.620	mg/kg	0	0.5
BZ41-008	2082681.623	749689.387	Lithium	12.000	NA	20400.0	11.550	mg/kg	0	0.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
BZ41-008	2082681.623	749689.387	Zinc	570.000	NA	307000.0	73.760	mg/kg	0	0.5
BZ41-008	*2082681.623*	*749689.387*	*Uranium-234*	*3.345*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2*
BZ41-008	2082681.623	749689.387	Uranium-238	3.345	NA	351.0	1.490	pCi/g	0.5	2
BZ41-009	2082686.451	749653.712	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ41-009	2082686.451	749653.712	Chromium	48.000	NA	268.0	16.990	mg/kg	0	0.5
BZ41-009	2082686.451	749653.712	Nickel	28.000	NA	20400.0	14.910	mg/kg	0	0.5
BZ41-009	*2082686.451*	*749653.712*	*Uranium-234*	*3.891*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
BZ41-009	2082686.451	749653.712	Uranium-235	0.235	NA	8.0	0.094	pCi/g	0	0.5
BZ41-009	2082686.451	749653.712	Uranium-238	3.891	NA	351.0	2.000	pCi/g	0	0.5
BZ41-009	2082686.451	749653.712	Zinc	230.000	NA	307000.0	73.760	mg/kg	0	0.5
BZ41-010	2082691.278	749618.037	Uranium-235	0.115	NA	8.0	0.094	pCi/g	0	0.5
BZ41-010	*2082691.278*	*749618.037*	*Uranium-234*	*4.516*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2.5*
BZ41-010	2082691.278	749618.037	Uranium-235	0.226	NA	8.0	0.120	pCi/g	0.5	2.5
BZ41-010	2082691.278	749618.037	Uranium-238	4.516	NA	351.0	1.490	pCi/g	0.5	2.5
BZ41-011	2082696.105	749582.362	Chromium	17.000	NA	268.0	16.990	mg/kg	0	0.5
BZ41-011	2082696.105	749582.362	Uranium-235	0.146	NA	8.0	0.094	pCi/g	0	0.5
BZ41-011	2082696.105	749582.362	Uranium-238	2.034	NA	351.0	2.000	pCi/g	0	0.5
BZ41-011	2082696.105	749582.362	Naphthalene	12.300	5.910	3090000.0	NA	µg/kg	0.5	2.5
BZ41-011	2082696.105	749582.362	Uranium-238	1.798	NA	351.0	1.490	pCi/g	0.5	2.5
BZ41-023	2082727.867	749614.729	Uranium-238	1.563	NA	351.0	1.490	pCi/g	2.5	4.5
BZ41-023	*2082727.867*	*749614.729*	*Uranium-234*	*4.562*	*NA*	*300.0*	*2.640*	*pCi/g*	*4.5*	*6.5*
BZ41-023	2082727.867	749614.729	Uranium-235	0.285	NA	8.0	0.120	pCi/g	4.5	6.5
BZ41-023	2082727.867	749614.729	Uranium-238	4.562	NA	351.0	1.490	pCi/g	4.5	6.5
BZ41-023	2082727.867	749614.729	Uranium-235	0.141	NA	8.0	0.120	pCi/g	6.5	7.3
BZ41-023	2082727.867	749614.729	Arsenic	14.000	NA	22.2	13.140	mg/kg	8.5	10.5
BZ41-023	2082727.867	749614.729	Uranium-235	0.150	NA	8.0	0.120	pCi/g	8.5	10.5
BZ41-023	2082727.867	749614.729	Uranium-238	1.498	NA	351.0	1.490	pCi/g	8.5	10.5
BZ41-023	2082727.867	749614.729	Uranium-235	0.128	NA	8.0	0.120	pCi/g	10.5	12.5
BZ41-023	2082727.867	749614.729	Manganese	1100.000	NA	3480.0	901.620	mg/kg	12.5	14.5
BZ41-023	2082727.867	749614.729	Uranium-238	1.582	NA	351.0	1.490	pCi/g	14.5	16.5
BZ42-001-01	2082724.104	749840.448	Strontium	70.000	NA	613000.0	48.940	mg/kg	0	0.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
BZ42-001-01	2082724.104	749840.448	Acetone	30.000	5.200	102000000.0	NA	µg/kg	0.5	2
BZ42-001-01	2082724.104	749840.448	Tetrachloroethene	2.700	1.100	615000.0	NA	µg/kg	0.5	2
BZ42-002-01	2082728.932	749804.773	Lithium	12.000	NA	20400.0	11.550	mg/kg	0	0.5
BZ42-002-01	2082728.932	749804.773	Strontium	72.000	NA	613000.0	48.940	mg/kg	0	0.5
BZ42-002-01	2082728.932	749804.773	Plutonium-239/240	0.072	NA	50.0	0.020	pCi/g	0.5	1
BZ42-002-01	2082728.932	749804.773	Uranium-235	0.206	NA	8.0	0.120	pCi/g	0.5	1
BZ42-003-01	2082733.759	749769.098	Aluminum	32000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Barium	300.000	NA	26400.0	141.260	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Beryllium	1.300	NA	921.0	0.966	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Chromium	27.000	NA	268.0	16.990	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Copper	19.000	NA	40900.0	18.060	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Iron	22000.000	NA	307000.0	18037.000	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Lithium	18.000	NA	20400.0	11.550	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Nickel	18.000	NA	20400.0	14.910	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Uranium-235	0.181	NA	8.0	0.094	pCi/g	0	0.5
BZ42-003-01	2082733.759	749769.098	Vanadium	49.000	NA	7150.0	45.590	mg/kg	0	0.5
BZ42-003-01	2082733.759	749769.098	Arsenic	14.000	NA	22.2	13.140	mg/kg	0.5	1
BZ42-003-01	2082733.759	749769.098	Uranium-235	0.153	NA	8.0	0.120	pCi/g	0.5	1
BZ42-005-01	2082695.623	749818.430	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ42-005-01	2082695.623	749818.430	Chromium	17.000	NA	268.0	16.990	mg/kg	0	0.5
BZ42-005-01	2082695.623	749818.430	Uranium-235	0.116	NA	8.0	0.094	pCi/g	0	0.5
BZ42-009	2082667.141	749796.412	Aluminum	18000.000	NA	228000.0	16902.000	mg/kg	0	0.5
BZ42-009	2082667.141	749796.412	Uranium-235	0.158	NA	8.0	0.094	pCi/g	0	0.5
BZ42-009	2082667.141	749796.412	Naphthalene	7.710	5.450	3090000.0	NA	ug/kg	0.5	2
CA40-014	*2082857.823*	*749549.753*	*Uranium-234*	*2.364*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA40-014	2082857.823	749549.753	Uranium-235	0.214	NA	8.0	0.094	pCi/g	0	0.5
CA40-014	2082857.823	749549.753	Uranium-238	2.364	NA	351.0	2.000	pCi/g	0	0.5
CA40-014	*2082857.823*	*749549.753*	*Uranium-234*	*3.982*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*1.1*
CA40-014	2082857.823	749549.753	Uranium-235	0.153	NA	8.0	0.120	pCi/g	0.5	1.1
CA40-014	2082857.823	749549.753	Uranium-238	3.982	NA	351.0	1.490	pCi/g	0.5	1.1
CA41-017	2082862.126	749750.135	Chromium	26.000	NA	268.0	16.990	mg/kg	0	0.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
CA41-017	2082862.126	749750.135	Nickel	18.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-017	2082862.126	749750.135	Zinc	160.000	NA	307000.0	73.760	mg/kg	0	0.5
CA41-017	2082862.126	749750.135	Uranium-235	0.139	NA	8.0	0.120	pCi/g	0.5	1.5
CA41-017	2082862.126	749750.135	Uranium-238	1.794	NA	351.0	1.490	pCi/g	0.5	1.5
CA41-018	2082867.002	749714.453	Chromium	17.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-018	2082867.002	749714.453	Nickel	16.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-018	2082867.002	749714.453	Zinc	500.000	NA	307000.0	73.760	mg/kg	0	0.5
CA41-018	2082867.002	749714.453	Uranium-235	0.170	NA	8.0	0.120	pCi/g	0.5	1.5
CA41-018	2082867.002	749714.453	Uranium-238	1.519	NA	351.0	1.490	pCi/g	0.5	1.5
CA41-018	2082867.002	749714.453	Zinc	330.000	NA	307000.0	139.100	mg/kg	0.5	1.5
CA41-019	2082871.823	749678.796	Chromium	80.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-019	2082871.823	749678.796	Copper	29.000	NA	40900.0	18.060	mg/kg	0	0.5
CA41-019	2082871.823	749678.796	Nickel	70.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-019	2082871.823	749678.796	Uranium-235	0.167	NA	8.0	0.094	pCi/g	0	0.5
CA41-019	2082871.823	749678.796	Zinc	1700.000	NA	307000.0	73.760	mg/kg	0	0.5
CA41-019	2082871.823	749678.796	Uranium-235	0.141	NA	8.0	0.120	pCi/g	0.5	2.5
CA41-019	2082871.823	749678.796	Zinc	310.000	NA	307000.0	139.100	mg/kg	0.5	2.5
CA41-020	2082876.650	749643.121	2-Butanone	5.500	4.900	192000000.0	NA	µg/kg	0.5	2.5
CA41-020	2082876.650	749643.121	Acetone	18.000	4.800	102000000.0	NA	µg/kg	0.5	2.5
CA41-023	2082833.683	749728.105	Copper	28.000	NA	40900.0	18.060	mg/kg	0	0.5
CA41-023	2082833.683	749728.105	Iron	22000.000	NA	307000.0	18037.000	mg/kg	0	0.5
CA41-023	2082833.683	749728.105	Manganese	530.000	NA	3480.0	365.080	mg/kg	0	0.5
CA41-023	*2082833.683*	*749728.105*	*Uranium-234*	*4.495*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-023	2082833.683	749728.105	Uranium-235	0.191	NA	8.0	0.094	pCi/g	0	0.5
CA41-023	2082833.683	749728.105	Uranium-238	4.495	NA	351.0	2.000	pCi/g	0	0.5
CA41-023	2082833.683	749728.105	Zinc	86.000	NA	307000.0	73.760	mg/kg	0	0.5
CA41-023	*2082833.683*	*749728.105*	*Uranium-234*	*4.208*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*1.2*
CA41-023	2082833.683	749728.105	Uranium-235	0.222	NA	8.0	0.120	pCi/g	0.5	1.2
CA41-023	2082833.683	749728.105	Uranium-238	4.208	NA	351.0	1.490	pCi/g	0.5	1.2
CA41-024	2082838.514	749692.453	Copper	28.000	NA	40900.0	18.060	mg/kg	0	0.5
CA41-024	2082838.514	749692.453	Strontium	69.000	NA	613000.0	48.940	mg/kg	0	0.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
CA41-025	**2082843.341**	**749656.778**	**Chromium**	**2600.000**	**NA**	**268.0**	**16.990**	**mg/kg**	**0**	**0.5**
CA41-025	2082843.341	749656.778	Cobalt	34.000	NA	1550.0	10.910	mg/kg	0	0.5
CA41-025	2082843.341	749656.778	Copper	110.000	NA	40900.0	18.060	mg/kg	0	0.5
CA41-025	2082843.341	749656.778	Manganese	430.000	NA	3480.0	365.080	mg/kg	0	0.5
CA41-025	2082843.341	749656.778	Nickel	1400.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-025	*2082843.341*	*749656.778*	*Uranium-234*	*2.617*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-025	2082843.341	749656.778	Uranium-235	0.175	NA	8.0	0.094	pCi/g	0	0.5
CA41-025	2082843.341	749656.778	Uranium-238	2.617	NA	351.0	2.000	pCi/g	0	0.5
CA41-025	*2082843.341*	*749656.778*	*Uranium-234*	*5.607*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2.5*
CA41-025	2082843.341	749656.778	Uranium-235	0.284	NA	8.0	0.120	pCi/g	0.5	2.5
CA41-025	2082843.341	749656.778	Uranium-238	5.607	NA	351.0	1.490	pCi/g	0.5	2.5
CA41-026	*2082848.168*	*749621.103*	*Uranium-234*	*2.513*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-026	2082848.168	749621.103	Uranium-238	2.513	NA	351.0	2.000	pCi/g	0	0.5
CA41-027	2082852.996	749585.428	Chromium	34.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-027	2082852.996	749585.428	Nickel	23.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-027	2082852.996	749585.428	Uranium-235	0.207	NA	8.0	0.094	pCi/g	0	0.5
CA41-027	2082852.996	749585.428	Uranium-235	0.144	NA	8.0	0.120	pCi/g	0.5	2.5
CA41-028	*2082800.368*	*749741.815*	*Uranium-234*	*4.132*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-028	2082800.368	749741.815	Uranium-235	0.244	NA	8.0	0.094	pCi/g	0	0.5
CA41-028	2082800.368	749741.815	Uranium-238	4.132	NA	351.0	2.000	pCi/g	0	0.5
CA41-028	*2082800.368*	*749741.815*	*Uranium-234*	*2.839*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*1.5*
CA41-028	2082800.368	749741.815	Uranium-235	0.193	NA	8.0	0.120	pCi/g	0.5	1.5
CA41-028	2082800.368	749741.815	Uranium-238	2.839	NA	351.0	1.490	pCi/g	0.5	1.5
CA41-029	2082805.176	749706.161	Chromium	24.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-029	2082805.176	749706.161	Cobalt	12.000	NA	1550.0	10.910	mg/kg	0	0.5
CA41-029	2082805.176	749706.161	Nickel	15.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-029	*2082805.176*	*749706.161*	*Uranium-234*	*4.246*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-029	2082805.176	749706.161	Uranium-235	0.234	NA	8.0	0.094	pCi/g	0	0.5
CA41-029	2082805.176	749706.161	Uranium-238	4.246	NA	351.0	2.000	pCi/g	0	0.5
CA41-029	*2082805.176*	*749706.161*	*Uranium-234*	*6.392*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2.5*
CA41-029	2082805.176	749706.161	Uranium-238	6.392	NA	351.0	1.490	pCi/g	0.5	2.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
CA41-031	2082814.859	749634.760	Chromium	20.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-031	2082814.859	749634.760	Nickel	15.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-032	*2082819.687*	*749599.085*	*Uranium-234*	*2.937*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-032	2082819.687	749599.085	Uranium-238	2.937	NA	351.0	2.000	pCi/g	0	0.5
CA41-032	*2082819.687*	*749599.085*	*Uranium-234*	*4.381*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2.5*
CA41-032	2082819.687	749599.085	Uranium-235	0.243	NA	8.0	0.120	pCi/g	0.5	2.5
CA41-032	2082819.687	749599.085	Uranium-238	4.381	NA	351.0	1.490	pCi/g	0.5	2.5
CA41-033	*2082824.514*	*749563.410*	*Uranium-234*	*4.167*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-033	2082824.514	749563.410	Uranium-235	0.281	NA	8.0	0.094	pCi/g	0	0.5
CA41-033	2082824.514	749563.410	Uranium-238	4.167	NA	351.0	2.000	pCi/g	0	0.5
CA41-033	2082824.514	749563.410	Naphthalene	26.100	5.790	3090000.0	NA	µg/kg	0.5	2.5
CA41-033	*2082824.514*	*749563.410*	*Uranium-234*	*3.668*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*2.5*
CA41-033	2082824.514	749563.410	Uranium-235	0.202	NA	8.0	0.120	pCi/g	0.5	2.5
CA41-033	2082824.514	749563.410	Uranium-238	3.668	NA	351.0	1.490	pCi/g	0.5	2.5
CA41-034	2082767.068	749755.441	Aluminum	25000.000	NA	228000.0	16902.000	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Beryllium	1.100	NA	921.0	0.966	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Chromium	24.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Iron	20000.000	NA	307000.0	18037.000	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Lithium	16.000	NA	20400.0	11.550	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Nickel	17.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Vanadium	46.000	NA	7150.0	45.590	mg/kg	0	0.5
CA41-034	2082767.068	749755.441	Acetone	12.000	5.600	102000000.0	NA	µg/kg	0.5	2.5
CA41-047	2082760.496	749744.696	Aluminum	22000.000	NA	228000.0	16902.000	mg/kg	0	0.5
CA41-047	2082760.496	749744.696	Beryllium	1.000	NA	921.0	0.966	mg/kg	0	0.5
CA41-047	2082760.496	749744.696	Chromium	20.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-047	2082760.496	749744.696	Lithium	14.000	NA	20400.0	11.550	mg/kg	0	0.5
CA41-047	*2082760.496*	*749744.696*	*Uranium-234*	*3.448*	*NA*	*300.0*	*2.253*	*pCi/g*	*0*	*0.5*
CA41-047	2082760.496	749744.696	Uranium-238	3.448	NA	351.0	2.000	pCi/g	0	0.5
CA41-048	2082744.181	749679.713	Uranium-235	0.159	NA	8.0	0.120	pCi/g	0.5	2.5
CA41-048	2082744.181	749679.713	Acetone	145.000	120.000	102000000.0	NA	µg/kg	9	10.8
CA41-048	*2082744.181*	*749679.713*	*Uranium-234*	*2.772*	*NA*	*300.0*	*2.640*	*pCi/g*	*9*	*10.8*

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
CA41-048	2082744.181	749679.713	Uranium-235	0.204	NA	8.0	0.120	pCi/g	9	10.8
CA41-048	2082744.181	749679.713	Uranium-238	2.772	NA	351.0	1.490	pCi/g	9	10.8
CA41-049	2082792.301	749633.092	Chromium	32.000	NA	268.0	16.990	mg/kg	0	0.5
CA41-049	2082792.301	749633.092	Lithium	13.000	NA	20400.0	11.550	mg/kg	0	0.5
CA41-049	2082792.301	749633.092	Nickel	26.000	NA	20400.0	14.910	mg/kg	0	0.5
CA41-049	2082792.301	749633.092	Strontium	78.000	NA	613000.0	48.940	mg/kg	0	0.5
CA41-049	2082792.301	749633.092	Uranium-235	0.136	NA	8.0	0.094	pCi/g	0	0.5
CA41-050	2082775.987	749568.109	Uranium-235	0.159	NA	8.0	0.120	pCi/g	4.5	6.5
CA41-050	2082775.987	749568.109	Uranium-235	0.141	NA	8.0	0.120	pCi/g	8.5	10.5
CA41-050	*2082775.987*	*749568.109*	*Uranium-234*	*2.908*	*NA*	*300.0*	*2.640*	*pCi/g*	*10.5*	*12.5*
CA41-050	2082775.987	749568.109	Uranium-235	0.193	NA	8.0	0.120	pCi/g	10.5	12.5
CA41-050	2082775.987	749568.109	Uranium-238	2.908	NA	351.0	1.490	pCi/g	10.5	12.5
CA42-015	2082847.267	749821.052	Uranium-235	0.174	NA	8.0	0.094	pCi/g	0	0.5
CA42-015	*2082847.267*	*749821.052*	*Uranium-234*	*3.655*	*NA*	*300.0*	*2.640*	*pCi/g*	*0.5*	*1.6*
CA42-015	2082847.267	749821.052	Uranium-235	0.166	NA	8.0	0.120	pCi/g	0.5	1.6
CA42-015	2082847.267	749821.052	Uranium-238	3.655	NA	351.0	1.490	pCi/g	0.5	1.6
CA42-016	2082846.729	749787.208	Copper	24.000	NA	40900.0	18.060	mg/kg	0	0.5
CA42-016	2082846.729	749787.208	Iron	19000.000	NA	307000.0	18037.000	mg/kg	0	0.5
CA42-016	2082846.729	749787.208	Manganese	420.000	NA	3480.0	365.080	mg/kg	0	0.5
CA42-016	2082846.729	749787.208	Uranium-235	0.123	NA	8.0	0.094	pCi/g	0	0.5
CA42-016	2082846.729	749787.208	Uranium-235	0.146	NA	8.0	0.120	pCi/g	0.5	2.5
CA42-019	2082824.038	749799.503	Chromium	31.000	NA	268.0	16.990	mg/kg	0	0.5
CA42-019	2082824.038	749799.503	Copper	19.000	NA	40900.0	18.060	mg/kg	0	0.5
CA42-019	2082824.038	749799.503	Nickel	20.000	NA	20400.0	14.910	mg/kg	0	0.5
CA42-019	2082824.038	749799.503	Uranium-235	0.139	NA	8.0	0.094	pCi/g	0	0.5
CA42-019	2082824.038	749799.503	Zinc	82.000	NA	307000.0	73.760	mg/kg	0	0.5
CA42-020	2082828.319	749770.177	Copper	31.000	NA	40900.0	18.060	mg/kg	0	0.5
CA42-020	2082828.319	749770.177	Iron	23000.000	NA	307000.0	18037.000	mg/kg	0	0.5
CA42-020	2082828.319	749770.177	Manganese	490.000	NA	3480.0	365.080	mg/kg	0	0.5
CA42-020	2082828.319	749770.177	Uranium-235	0.129	NA	8.0	0.094	pCi/g	0	0.5
CA42-020	2082828.319	749770.177	Zinc	92.000	NA	307000.0	73.760	mg/kg	0	0.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
CA42-020	2082828.319	749770.177	Uranium-235	0.155	NA	8.0	0.120	pCi/g	0.5	1.5
CA42-024	2082795.520	749777.448	Acetone	7.200	5.400	102000000.0	NA	µg/kg	0.5	1.8
CA42-024	2082795.520	749777.448	Tetrachloroethene	1.200	1.200	615000.0	NA	µg/kg	0.5	1.8
CA42-026	2082757.413	749826.791	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0	0.5
CA42-026	2082757.413	749826.791	Chromium	26.000	NA	268.0	16.990	mg/kg	0	0.5
CA42-026	2082757.413	749826.791	Nickel	19.000	NA	20400.0	14.910	mg/kg	0	0.5
CA42-026	2082757.413	749826.791	Uranium-235	0.159	NA	8.0	0.094	pCi/g	0	0.5
CA42-026	2082757.413	749826.791	Copper	210.000	NA	40900.0	38.210	mg/kg	0.5	2.5
CA42-026	2082757.413	749826.791	Iron	44000.000	NA	307000.0	41046.520	mg/kg	0.5	2.5
CA42-026	2082757.413	749826.791	Uranium-235	0.130	NA	8.0	0.120	pCi/g	0.5	2.5
CA42-026	2082757.413	749826.791	Uranium-238	1.585	NA	351.0	1.490	pCi/g	0.5	2.5
CA42-027	2082762.241	749791.116	Antimony	0.600	NA	409.0	0.470	mg/kg	0	0.5
CA42-027	2082762.241	749791.116	Strontium	73.000	NA	613000.0	48.940	mg/kg	0	0.5
CA42-027	2082762.241	749791.116	Uranium-235	0.169	NA	8.0	0.094	pCi/g	0	0.5
CA42-027	2082762.241	749791.116	Uranium-235	0.145	NA	8.0	0.120	pCi/g	0.5	2.5
CA42-030	2082876.151	749823.087	Zinc	230.000	NA	307000.0	73.760	mg/kg	0	0.5
CA42-030	2082876.151	749823.087	Lead	26.000	NA	1000.0	24.970	mg/kg	0.5	2.5
CA42-030	2082876.151	749823.087	Tetrachloroethene	5.500	1.100	615000.0	NA	µg/kg	0.5	2.5
CA42-030	2082876.151	749823.087	Tetrachloroethene	5.000	1.100	615000.0	NA	µg/kg	2.5	4.5
CA42-030	2082876.151	749823.087	Zinc	150.000	NA	307000.0	139.100	mg/kg	2.5	4.5
CA42-030	2082876.151	749823.087	Tetrachloroethene	1.200	1.100	615000.0	NA	µg/kg	4.5	6.5
CA42-031	2082872.539	749815.003	Zinc	150.000	NA	307000.0	73.760	mg/kg	0	0.5
CA42-031	2082872.539	749815.003	Acetone	7.000	5.100	102000000.0	NA	µg/kg	0.5	1.5
CA42-031	2082872.539	749815.003	Tetrachloroethene	3.200	1.100	615000.0	NA	µg/kg	0.5	1.5
CA42-031	2082872.539	749815.003	Acetone	7.400	5.700	102000000.0	NA	µg/kg	2.5	4.5
CA42-031	2082872.539	749815.003	Uranium-235	0.431	NA	8.0	0.120	pCi/g	2.5	4.5
CA42-031	2082872.539	749815.003	Acetone	9.200	5.700	102000000.0	NA	µg/kg	6.5	8.5
CA42-031	2082872.539	749815.003	Acetone	7.500	5.800	102000000.0	NA	µg/kg	8.5	9.5
CA42-032	2082797.693	749804.988	Aluminum	19000.000	NA	228000.0	16902.000	mg/kg	0	0.5
CA42-032	2082797.693	749804.988	Chromium	19.000	NA	268.0	16.990	mg/kg	0	0.5
CA42-032	2082797.693	749804.988	Nickel	16.000	NA	20400.0	14.910	mg/kg	0	0.5

Location	Actual Easting	Actual Northing	Analyte	Result	Reporting Limit	WRW AL	Background Mean + 2 Standard Deviations	Result Unit	Start Depth (ft)	End Depth (ft)
CA42-032	2082797.693	749804.988	Uranium-235	0.161	NA	8.0	0.094	pCi/g	0	0.5
CA42-032	2082797.693	749804.988	Zinc	140.000	NA	307000.0	73.760	mg/kg	0	0.5
CA42-032	2082797.693	749804.988	Uranium-235	0.142	NA	8.0	0.120	pCi/g	0.5	2.5
CA42-032	2082797.693	749804.988	Uranium-235	0.140	NA	8.0	0.120	pCi/g	2.5	4.5
CA42-032	2082797.693	749804.988	Uranium-238	1.642	NA	351.0	1.490	pCi/g	2.5	4.5
CA42-033	2082797.316	749845.369	Aluminum	19000.000	NA	228000.0	16902.000	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Beryllium	1.100	NA	921.0	0.966	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Chromium	19.000	NA	268.0	16.990	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Copper	21.000	NA	40900.0	18.060	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Iron	22000.000	NA	307000.0	18037.000	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Lithium	12.000	NA	20400.0	11.550	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Nickel	16.000	NA	20400.0	14.910	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Uranium-235	0.133	NA	8.0	0.094	pCi/g	0	0.5
CA42-033	2082797.316	749845.369	Vanadium	47.000	NA	7150.0	45.590	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Zinc	76.000	NA	307000.0	73.760	mg/kg	0	0.5
CA42-033	2082797.316	749845.369	Uranium-235	0.165	NA	8.0	0.120	pCi/g	2.5	4.5
CA42-033	2082797.316	749845.369	Uranium-238	2.516	NA	351.0	1.490	pCi/g	2.5	4.5

µg/kg = micrograms per kilogram (may appear as ug/kg)
mg/kg = milligrams per kilogram
pCi/g = picocuries per gram
NA = Not Applicable
ft = foot
Bold font denotes AL exceedance.
Italic font denotes result was derived by calculation based on other analyses.

The intension was to sample both locations from the surface to 10.5 ft. CA42-030 was successfully sampled, but at CA42-031 there were two no recovery zones from 1.5 to 2.5 ft and from 9.5 to 10.5 ft. A presume gravel layer was not detected at these locations. At CA42-031 water flowed up through the Geoprobe drill string for a time from a depth of approximately 8 ft. This was attributed to termination of a drain from a pre-existing building in the area. While some analyte concentrations from these locations were above above Background Means Plus Two Standard Deviations, all were below WRW ALs (Table 3, Figures 3). VOCs detected above background at both locations will be evaluated as part of the Groundwater Interim Measure/Interim Remediation Action (IM/IRA).

Based on the Contact Record of February 19, 2004 (Appendix A) samples of fill under the northern half of the former Building 551 footprint were to be characterized. Samples were collected and analyzed from three locations in the southern part of the footprint (BZ40-007, BZ41-023, and CA41-050) and three locations from the northern part (CA41-047, CA41-048, and CA41-049) (Figures 3 and 4). The media sampled (fill or native soil) are listed in Table 1. Result concentrations from these samples were in some cases above Background Means Plus Two Standard Deviations but below WRW ALs (Table 3, Figures 3 and 4). Note that at locations CA41-047 and CA41-049 there was no fill, only native soil at the surface (Table 1).

2.3 Sums of Ratios

Radionuclide RFCA sums of ratios (SORs) were calculated for IHSS 500-158 sampling locations based on the accelerated action analytical data for the contaminants of concern (COCs) and the WRW ALs. Radionuclide SORs were calculated for all locations with analytical results greater than background means plus two standard deviations or RLs for americium-241, plutonium-239/240, uranium-234, uranium-235, and uranium-238. Plutonium-239/240 activities are derived from the americium-241 activities (that is, plutonium-239/240 activity = americium-241 gamma spectroscopy activity x 5.7) where HPGe detection was used for analysis. Table 4 presents the SORs for surface soil (0 to 2.5 ft). All SORs for radionuclides in soil are less than 1.

Table 4
RFCA Radionuclide SORs

Location	Start Depth (ft)	End Depth (ft)	SOR to WRW
BZ40-003	0.5	2.5	0.029
BZ41-006	0	0.5	0.020
BZ41-006	0.5	2	0.049
BZ41-007	0	0.5	0.001
BZ41-008	0.5	2	0.021
BZ41-009	0	0.5	0.053
BZ41-010	0	0.5	0.014
BZ41-010	0.5	2.5	0.056
BZ41-011	0	0.5	0.024
BZ41-011	0.5	2.5	0.005
BZ41-023	2.5	4.5	0.004
BZ41-023	4.5	6.5	0.064

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Location	Start Depth (ft)	End Depth (ft)	SOR to WRW
BZ41-023	6.5	7.3	0.018
BZ41-023	8.5	10.5	0.023
BZ41-023	10.5	12.5	0.016
BZ41-023	14.5	16.5	0.005
BZ42-002-01	0.5	1	0.026
BZ42-003-01	0	0.5	0.023
BZ42-003-01	0.5	1	0.019
BZ42-005-01	0	0.5	0.014
BZ42-009	0	0.5	0.020
CA40-014	0	0.5	0.041
CA40-014	0.5	1.1	0.044
CA41-017	0.5	1.5	0.022
CA41-018	0.5	1.5	0.026
CA41-019	0	0.5	0.021
CA41-019	0.5	2.5	0.018
CA41-023	0	0.5	0.052
CA41-023	0.5	1.2	0.054
CA41-025	0	0.5	0.038
CA41-025	0.5	2.5	0.070
CA41-026	0	0.5	0.016
CA41-027	0	0.5	0.026
CA41-027	0.5	2.5	0.018
CA41-028	0	0.5	0.056
CA41-028	0.5	1.5	0.042
CA41-029	0	0.5	0.055
CA41-029	0.5	2.5	0.040
CA41-032	0	0.5	0.018
CA41-032	0.5	2.5	0.057
CA41-033	0	0.5	0.061
CA41-033	0.5	2.5	0.048
CA41-047	0	0.5	0.021
CA41-048	0.5	2.5	0.020
CA41-048	9	10.8	0.043
CA41-049	0	0.5	0.017
CA41-050	4.5	6.5	0.020
CA41-050	8.5	10.5	0.018
CA41-050	10.5	12.5	0.042
CA42-015	0	0.5	0.022
CA42-015	0.5	1.6	0.043
CA42-016	0	0.5	0.015
CA42-016	0.5	2.5	0.018
CA42-019	0	0.5	0.017
CA42-020	0	0.5	0.016
CA42-020	0.5	1.5	0.019
CA42-026	0	0.5	0.020

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Location	Start Depth (ft)	End Depth (ft)	SOR to WRW
CA42-026	0.5	2.5	0.021
CA42-027	0	0.5	0.021
CA42-027	0.5	2.5	0.018
CA42-031	2.5	4.5	0.054
CA42-032	0	0.5	0.020
CA42-032	0.5	2.5	0.018
CA42-032	2.5	4.5	0.022
CA42-033	0	0.5	0.017
CA42-033	2.5	4.5	0.028

Surface soil SORs for non-radionuclide COCs are shown in Table 5. Non-radionuclide SORs were calculated for all locations with analytical results greater than 10 percent of the WRW ALs. Aluminum, arsenic, iron, manganese, and polyaromatic hydrocarbons (PAHs) were not included in the nonradionuclide SORs. Except for location CA41-025, all nonradionuclide SORs for surface soil were less than 1. The nonradionuclide SOR for CA41-025 was greater than 1 because of the initial chromium detection that was above the WRW AL. Soil at this location has been removed, and confirmation samples indicate residual chromium is well below the WRW AL. The confirmation samples are discussed in Section 4.0.

Table 5
RFCA Non-Radionuclide Surface Soil SORs

Location	Start Depth (ft)	End Depth (ft)	SOR to WRW
BZ41-009	0	0.5	0.179
BZ42-003-01	0	0.5	0.101
CA41-019	0	0.5	0.299
CA41-025	0	0.5	9.701
CA41-027	0	0.5	0.127
CA41-049	0	0.5	0.119
CA42-019	0	0.5	0.116

3.0 SUMMARY STATISTICS

Summary statistics, by analyte, were calculated for the IHSS 500-158 sampling locations, as presented in Tables 6 and 7.

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Table 6
IHSS Group 500-2 Surface Soil Summary Statistics

Analyte	Number Samples Analyzed	Detection Frequency	Mean Concentration	Maximum Concentration	Background Mean Plus 2 Standard Deviations	WRW AL	Unit
Aluminum	47	25.53%	20166.667	32000.000	16902.000	228000	mg/kg
Antimony	47	4.26%	1.250	1.900	0.470	409	mg/kg
Barium	47	2.13%	300.000	300.000	141.260	26400	mg/kg
Beryllium	47	8.51%	1.125	1.300	0.966	921	mg/kg
Cadmium	47	2.13%	3.300	3.300	1.612	962	mg/kg
Chromium	47	46.81%	143.500	2600.000	16.990	268	mg/kg
Cobalt	47	4.26%	23.000	34.000	10.910	1550	mg/kg
Copper	47	23.40%	31.818	110.000	18.060	40900	mg/kg
Iron	47	12.77%	21333.333	23000.000	18037.000	307000	mg/kg
Lead	47	2.13%	73.000	73.000	54.620	1000	mg/kg
Lithium	47	17.02%	13.625	18.000	11.550	20400	mg/kg
Manganese	47	8.51%	467.500	530.000	365.080	3480	mg/kg
Nickel	47	34.04%	108.250	1400.000	14.910	20400	mg/kg
Strontium	47	12.77%	70.333	78.000	48.940	613000	mg/kg
Vanadium	47	6.38%	47.333	49.000	45.590	7150	mg/kg
Zinc	47	29.79%	307.571	1700.000	73.760	307000	mg/kg
Plutonium-239/240	43	2.33%	0.106	0.106	0.066	50	pCi/g
Uranium-234	43	23.26%	3.481	4.495	2.253	300	pCi/g
Uranium-235	43	55.81%	0.173	0.281	0.094	8	pCi/g
Uranium-238	43	25.58%	3.349	4.495	2.000	351	pCi/g

Table 7
IHSS Group 500-2 Subsurface Soil Summary Statistics

Analyte	Number Samples Analyzed	Detection Frequency	Mean Concentration	Maximum Concentration	Background Mean Plus 2 Standard Deviations	WRW AL	Unit
Arsenic	69	4.35%	14.333	15.000	13.140	22.2	mg/kg
Copper	69	1.45%	210.000	210.000	38.210	40900	mg/kg
Iron	69	1.45%	44000.000	44000.000	41046.520	307000	mg/kg
Lead	69	4.35%	27.667	32.000	24.970	1000	mg/kg
Manganese	69	1.45%	1100.000	1100.000	901.620	3480	mg/kg
Zinc	69	4.35%	263.333	330.000	139.100	307000	mg/kg
Plutonium-239/240	69	1.45%	0.072	0.072	0.020	50	pCi/g
Uranium-234	69	20.29%	3.998	6.392	2.640	300	pCi/g
Uranium-235	69	47.83%	0.184	0.431	0.120	8	pCi/g
Uranium-238	69	34.78%	3.078	6.392	1.490	351	pCi/g
2-Butanone	59	1.69%	5.500	5.500	-	192000000	ug/kg
Acetone	59	15.25%	27.033	145.000	-	102000000	ug/kg
Naphthalene	59	6.78%	13.440	26.100	-	3090000	ug/kg
Tetrachloroethene	59	11.86%	2.871	5.500	-	615000	ug/kg

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4.0 ACCELERATED ACTION

Accelerated action objectives were developed for the IHSS 500-158 Radioactive Site - Building 551, and are described in ER RSOP Notification #04-14 (DOE 2004). ER RSOP remedial action objectives (RAOs) include the following:

- Provide a remedy consistent with the RFETS goal of protection of human health and the environment;
- Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and
- Minimize the spread of contaminants during implementation of accelerated actions.

The accelerated action remediation goals for IHSS 500-158 included the following:

- Remove soil with chromium concentrations greater than the RFCA WRW AL to a depth of 6 inches; and
- Collect confirmation soil samples in accordance with ER RSOP Notification #04-14 (DOE 2004).

Accelerated action activities were conducted between March 1 and May 6, 2004. The area is scheduled to be reseeded. Starting and ending dates of significant activities are listed in Table 8. The soil remediation area is shown on Figure 5. Photographs of site activities are provided in Appendix B.

Table 8
Dates of Accelerated Action Activities for IHSS Group 500-2 - IHSS 500-158

Activity	Starting Date	Ending Date	Duration
Characterization Sampling	March 1, 2004	March 17, 2004	18 Days
Removal Activity	April 27, 2004	April 27, 2004	1 Day
Backfilling Excavation	May 6, 2004	May 6, 2004	1 Day
Reseeding[a]	Upon final grading	Upon final grading	

[a]Planned activity not performed to date.

4.1 Soil Removal Activities

All accelerated action objectives were achieved. Removal activities are described below.

ER RSOP Notification #04-14 (DOE 2004) accelerated action project objectives for IHSS 500-158 were achieved through the following:

- Chromium-contaminated soil at location CA41-025 was removed from an area approximately 4.5 ft by 5 ft by 6 inches deep in accordance with ER RSOP Notification #04-14 (DOE 2004).
- Confirmation samples were collected in accordance with the IASAP (DOE 2001) to verify that COC concentrations were less than WRW ALs.

These removal activities are described below. Figure 4 presents the original contaminated location, CA41-025, and Figure 5 presents confirmation sampling results and the approximate boundary of the remediated area.

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4.1.1 Soil Remediation and Site Reclamation

The excavated area was backfilled with clean soil and regraded. Documentation regarding approval to backfill is provided in an ER Regulatory Contact Record dated May 6, 2004 (Appendix A).

5.0 CONFIRMATION SAMPLING

Confirmation samples were collected from the midpoints of the excavation side walls from the full 6-inch depth of the excavation. These samples were analyzed at an off-site laboratory for metals. Results greater than background means plus two standard deviations are shown on Figure 5 and listed in Table 9.

Table 9
IHSS Group 500-2 – IHSS 500-158 Confirmation Sampling Results
Greater Than Background Means Plus Two Standard Deviations or Reporting Limits

Location	Easting	Northing	Analyte	Result	Reporting Limit	Background Mean +2 Standard Deviations	WRW AL	Unit
CA41-052	2082845.420	749657.051	Strontium	60	NA	48.94	613000	mg/kg
CA41-053	2082843.459	749655.036	Chromium	22	NA	16.99	268	mg/kg

The remedial action was deemed complete after the results from all four confirmation samples indicated metal concentrations less than WRW ALs. The highest chromium value was 22 mg/kg, which is significantly less than the WRW AL of 268 mg/kg. This value is within the range of the other chromium values for this IHSS Group and is similar to the surface background value of 16.99 mg/kg and the subsurface background value of 68 mg/kg. Based on these results, the excavation was backfilled.

A confirmation sample at the center of the excavation was not required because soil from the 0.5 to 2.5 ft interval at the original location, CA41-025, was sampled and analyzed at an off-site laboratory during the characterization phase. Metal concentrations from this interval were less than WRW ALs.

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6.0 RCRA UNIT CLOSURE

Not applicable. There were no Resource Conservation and Recovery Act (RCRA) units to be closed.

7.0 SUBSURFACE SOIL RISK SCREEN

The SSRS follows the steps identified in Figure 3 of Attachment 5 of the RFCA Modification (DOE et al. 2003).

Screen 1 – Are the COC concentrations below RFCA Modification Table 3 soil ALs for the WRW?

Yes. As shown in Table 3, all IHSS Group 500-2 subsurface soil results greater than background means plus two standard deviations or RLs are less than RFCA WRW ALs.

Screen 2 – Is there a potential for subsurface soil to become surface soil (landslides and erosion areas identified on Figure 1 of the RFCA Modification)?

No. IHSS Group 500-2 is not located in an area susceptible to landslides or high erosion based on RFCA Modification Attachment 5, Figure 1.

Screen 3 – Does subsurface soil contamination for radionuclides exceed criteria defined in RFCA Modification Section 5.3 and Attachment 14?

No. As shown in Table 3, radionuclide activities are well below soil WRW ALs. Note: Attachment 14 is specific to Original Process Waste Lines (OPWL) and is not applicable to IHSS Group 500-2.

Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of the surface water standards?

No. Contaminant migration via erosion and groundwater are two possible pathways whereby surface water could become contaminated from IHSS 500-158 soil. As stated in Screen 2, IHSS 500-158 is not located in an area subject to erosion as identified on Figure 1 of the RFCA Modification. Currently, runoff from IHSS 500-158 is monitored at a surface water monitoring location. GS10 is the RFCA surface water Point of Evaluation (POE) for IHSS Group 500-2. Exceedances of surface water ALs have been detected at GS10; however, this station receives water from a large part of the IA, and, therefore, surface water quality at GS10 is not attributable to any single IHSS Group such as 500-2 (DOE 2002a, 2003c). Surface water issues will be addressed in the CRA.

Groundwater around IHSS 500-158 has recently been monitored at well locations 84602, 84702, P115589, and P115689. The following volatile organic compounds (VOCs) are present above groundwater ALs in at least one of these wells: 1,1-dichloroethene, 1,2-dichloroethane, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride (DOE 2002b, 2003d). The 2001 RFCA Annual Groundwater Monitoring Report (DOE 2002b) concluded that the VOC

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contamination in the IHSS 500-158 area, for the analytes above, is part of the IA Plume. Figure 8-3 from the 2001 Annual Report shows that well 84702 is in the center of an area of high tetrachloroethene concentration just northwest of IHSS Group 500-2. Results from the IHSS Group 500-2 accelerated action soil sampling indicate that trace amounts of tetrachloroethene were detected at several locations within the Group. Groundwater issues will be addressed in the Groundwater IM/IRA.

Other VOCs were found in soil from IHSS 500-158 during accelerated action sampling. Trace amounts of acetone, 2-butanone, and naphthalene were present at several locations (Figures 3 and 4 and Table 3).

8.0 STEWARDSHIP ANALYSIS

The IHSS Group 500-2 stewardship evaluation was conducted through ongoing consultation with the regulatory agencies. Frequent informal project updates, e-mails, and telephone and personal contact occurred throughout the project. Documentation associated with these contacts is provided in Appendix A.

8.1 Current Site Conditions

As discussed in Section 3.1, accelerated action at IHSS 500-158 consisted of excavation of the chromium WRW AL exceedance found at location CA41-025 and backfilling upon confirmation that the contamination was removed. Based on the accelerated action, the following conditions exist at IHSS 500-158:

- The potential source of contamination that existed in IHSS 500-158 (chromium at location CA41-025) was removed.
- Surface and subsurface contaminant concentrations in soil are greater than background means plus two standard deviations or RLs throughout IHSS 500-158.
- Residual contaminant concentrations are below RFCA WRW ALs.
- Building 551 was removed by Remediation, Industrial Decommissioning and Demolition, and Site Services (RISS) in early 2003.

8.2 Near-Term Management Recommendations

Because residual contaminant concentrations are low and potential contaminant sources were removed, mitigated, or found not to have existed, no specific near-term management actions are required. The potential contaminant source and pathway have been removed. Contaminant concentrations in soil remaining at IHSS 500-158 do not trigger any further accelerated action. Near-term recommendations include the following:

- Excavation at the site will continue to be controlled through the Site Soil Disturbance Permit process.
- Access will be restricted.
- Site access and the Soil Disturbance Permit process will remain in place pending implementation of long-term controls.

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8.3 Long-Term Stewardship Recommendations

Based on remaining environmental conditions at IHSS 500-158, no specific long-term stewardship activities are recommended beyond the generally applicable Site requirements. These requirements may be imposed on this area in the future, especially after the current use of the site as a source of fill ceases. Institutional controls that will be used as appropriate for this area include the following:

- Restrictions on excavation or other soil disturbance; and
- Prohibitions on groundwater pumping in the area of IHSS 500-158.

No specific engineered controls or environmental monitoring are recommended as a result of the conditions remaining at IHSS 500-158. Likewise, no specific institutional or physical controls are recommended as a result of the conditions remaining at IHSS 500-158.

This Closeout Report and associated documentation will be retained as part of the Rocky Flats Administrative Record (AR) file. The specific long-term stewardship recommendations will also be summarized in the Rocky Flats Long-Term Stewardship Strategy.

IHSS 500-158 will be evaluated as part of the Accelerated Action Ecological Site Evaluation (AAESE) and Sitewide CRA. The CRA is part of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) and Corrective Measures Study/Feasibility Study (CMS/FS) that will be conducted for the Site. The need for and extent of any more general, long-term stewardship activities will also be evaluated in the RFI/RI and CMS/FS and will be proposed as part of the preferred alternative in the Proposed Plan for the Site. Institutional controls and other long-term stewardship requirements for Rocky Flats will ultimately be contained in the Corrective Action Decision/Record of Decision (CAD/ROD), any post-closure Colorado Hazardous Waste Act (CHWA) permit that may be required, and any post-RFCA agreement.

9.0 DEVIATIONS FROM THE ER RSOP

There were no deviations from the ER RSOP.

10.0 POST-ACCELERATED ACTION CONDITIONS

Soil containing chromium from an excavation (4.5 ft by 5 ft by 6 inch) surrounding location CA41-025 was removed. After confirmation samples from the midpoints of the excavation walls (locations CA41-051, CA41-052, CA41-053, and CA41-054) indicated chromium levels were well below the WRW AL, the excavation was backfilled and rough-graded. After the site ceases to be a source of fill for other projects, it will be graded to final contour and reseeded.

The presence of residual contamination was determined based on accelerated action characterization and confirmation sampling results. Results indicate no contaminant concentrations in surface or subsurface soil greater than the RFCA WRW ALs. Residual soil concentrations greater than background means plus two standard deviations or RLs at IHSS 500-158 are shown on Figures 3, 4, and 5.

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SORs, based on the RFCA WRW ALs for radionuclides and accelerated action data, are listed in Table 4. Plutonium-239/240 activities are derived from the americium-241 activities as described in Section 2.0. All SORs for radionuclides in surface and subsurface soil were less than 1. Non-radionuclide SORs, based on the RFCA WRW ALs and accelerated action data, are listed in Table 5. The SOR at location CA41-025 was greater than 1 because of the chromium exceedance at that location. The location has been remediated, and residual soil chromium concentrations are less than the WRW AL.

11.0 WASTE MANAGEMENT

Two 55-gallon drums were filled with soil removed from the 4.5 ft by 5 ft by 6 inch excavation at location CA41-025., The waste was disposed of as low-level mixed waste. The drums are being transferred to the Material Stewardship group for storage and disposal.

12.0 SITE RECLAMATION

Upon removal of the contaminated soil at location CA41-025, the excavation was backfilled with clean soil. Currently, the IHSS Group 500-2 area is being used as a source of fill for other Site projects. When no longer used for fill, the area will be graded to final contour and reseeded.

13.0 NO LONGER REPRESENTATIVE SAMPLING LOCATIONS

The surface soil from location CA41-025 is considered NLR because it was removed during the remediation process (Section 3.1). Table 10 provides the coordinates of this location.

Table 10
NLR Sampling Location

Location	Easting	Northing	Media	Start Depth (ft)	End Depth (ft)
CA41-025	2082843.341	749656.778	Surface soil	0	0.5

14.0 DATA QUALITY ASSESSMENT

The DQOs for this project are described in the IASAP (DOE 2001). All DQOs for this project were achieved based on the following:

- Regulatory agency-approved sampling program design: IASAP Addendum #IA-03-07 (approval letter dated June 6, 2003 [CDPHE 2003]) and ER RSOP Notification #04-14 (approval letter dated April 12, 2004 [CDPHE 2004]);
- Samples collected in accordance with the IASAP (DOE 2001); and
- DQA conducted as documented in the following sections.

14.1 DQA Process

The DQA process ensures that the type, quantity, and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

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- U.S. Environmental Protection Agency (EPA), 1994a, Guidance for the Data Quality Objective Process, QA/G-4;
- EPA, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis, QA/G-9; and
- U.S. Department of Energy (DOE), 1999, Quality Assurance, Order 414.1A.

Verification and validation (V&V) of the data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

- EPA, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012;
- EPA, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013;
- Kaiser-Hill Company, L.L.C. (K-H) V&V Guidelines:
  - General Guidelines for Data Verification and Validation, DA-GR01-v2, 2002a
  - V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, 2002b
  - V&V Guidelines for Volatile Organics, DA-SS01-v3, 2002c
  - V&V Guidelines for Semivolatile Organics, DA-SS02-v3, 2002d
  - V&V Guidelines for Metals, DA-SS05-v3, 2002e; and
- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) AR for permanent storage 30 days after being provided to CDPHE and/or EPA.

14.2 Verification and Validation of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archival are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold times;
- Instrument calibrations;

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- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSDs);
- Laboratory control samples (LCSs);
- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (that is, within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation "flags" or qualifiers to individual records.

Raw, hard-copy data (for example, individual analytical data packages) are currently filed by report identification number (RIN) and maintained by K-H Analytical Services Division (ASD); older hard copies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS Soil Water Database (SWD).

The data sets addressed in this report are included on the enclosed compact disc in Microsoft Access 2000 format.

14.2.1 Accuracy

The following measures of accuracy were evaluated:

- LCSs;
- Surrogates;
- Field blanks; and
- Sample MSs.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near ALs when QC results could indicate unacceptable levels of uncertainty for decision-making purposes.

LCS Evaluation

The frequency of LCS measurements is presented in Table 11. As indicated in Table 11 LCS analyses were run for all methods except for gamma spectroscopy and SW-846 Method 6200. The onsite laboratories are not required to provide this data.

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Table 11
LCS Summary

Test Method	Lab Batch	Laboratory Control Standards
Alpha Spectroscopy	4070389	Yes
Alpha Spectroscopy	4070397	Yes
Alpha Spectroscopy	4070431	Yes
Alpha Spectroscopy	4076323	Yes
Alpha Spectroscopy	4076329	Yes
Alpha Spectroscopy	4076339	Yes
Alpha Spectroscopy	4078325	Yes
Alpha Spectroscopy	4078335	Yes
Alpha Spectroscopy	4078340	Yes
Alpha Spectroscopy	4082521	Yes
Alpha Spectroscopy	4082526	Yes
Alpha Spectroscopy	4082530	Yes
Alpha Spectroscopy	4083498	Yes
Alpha Spectroscopy	4083501	Yes
Alpha Spectroscopy	4084172	Yes
Alpha Spectroscopy	4084413	Yes
Alpha Spectroscopy	4084424	Yes
Alpha Spectroscopy	4084434	Yes
SW-846 6010	4063505	Yes
SW-846 6010	4063545	Yes
SW-846 6010	4064505	Yes
SW-846 6010	4064512	Yes
SW-846 6010	4065568	Yes
SW-846 6010	4065570	Yes
SW-846 6010	4068256	Yes
SW-846 6010	4068257	Yes
SW-846 6010	4069477	Yes
SW-846 6010	4069486	Yes
SW-846 6010	4070565	Yes
SW-846 6010	4071290	Yes
SW-846 6010	4071291	Yes
SW-846 6010	4071501	Yes
SW-846 6010	4072238	Yes
SW-846 6010	4076215	Yes
SW-846 6010	4077193	Yes
SW-846 6010	4077553	Yes
SW-846 6010	4078232	Yes
SW-846 6010	4078545	Yes
SW-846 6010	4079530	Yes
SW-846 6010	4082200	Yes
SW-846 6010	4082201	Yes

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Test Method	Lab Batch	Laboratory Control Standards
SW-846 6010	4125247	Yes
SW-846 6010	4126505	Yes
SW-846 8260	4070453	Yes
SW-846 8260	4072425	Yes
SW-846 8260	4077097	Yes
SW-846 8260	4079091	Yes
SW-846 8260	4081147	Yes
SW-846 8260	4081149	Yes
SW-846 8260	MS1 VOA_040302A	Yes
SW-846 8260	MS1 VOA_040303A	Yes
SW-846 8260	MS1 VOA_040309A	Yes
SW-846 8260	MS1 VOA_040315A	Yes
SW-846 8260	MS1 VOA_040316A	Yes
SW-846 8260	MS1 VOA_040318A	Yes
SW-846 8260	MS2 VOA_040302A	Yes
SW-846 8260	MS3 VOA_040303A	Yes
SW-846 8260	MS3 VOA_040305A	Yes
SW-846 8260	MS3 VOA_040308A	Yes
SW-846 8260	MS3 VOA_040309A	Yes
SW-846 8260	MS3 VOA_040316A	Yes

LCS results are summarized in Table 12. The minimum and maximum LCS recoveries are tablulated by chemical for the entire project. LCS results that were outside of tolerances were reviewed to determine whether a potential bias might be indicated. LCS recoveries are not indicative of matrix effects because they are not prepared using Site samples. LCS results do indicate whether the laboratory may be introducing a bias in the results. Recoveries reported above the upper limit may indicate the actual sample results are less than reported. Because this is environmentally conservative, no further action is needed.

Table 12
LCS Evaluation Summary

Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
SW-846 6010	7429-90-5	Aluminum	86	105	%REC
SW-846 6010	7440-36-0	Antimony	86	98	%REC
SW-846 6010	7440-38-2	Arsenic	87	97	%REC
SW-846 6010	7440-39-3	Barium	93	103	%REC
SW-846 6010	7440-41-7	Beryllium	86	106	%REC
SW-846 6010	7440-43-9	Cadmium	86	99	%REC
SW-846 6010	7440-47-3	Chromium	91	103	%REC
SW-846 6010	7440-48-4	Cobalt	89	100	%REC
SW-846 6010	7440-50-8	Copper	91	98	%REC
SW-846 6010	7439-89-6	Iron	89	105	%REC

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Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
SW-846 6010	7439-92-1	Lead	89	101	%REC
SW-846 6010	7439-93-2	Lithium	86	109	%REC
SW-846 6010	7439-96-5	Manganese	87	102	%REC
SW-846 6010	7439-97-6	Mercury	88	106	%REC
SW-846 6010	7439-98-7	Molybdenum	87	100	%REC
SW-846 6010	7440-02-0	Nickel	89	100	%REC
SW-846 6010	7782-49-2	Selenium	88	97	%REC
SW-846 6010	7440-22-4	Silver	94	105	%REC
SW-846 6010	7440-24-6	Strontium	92	101	%REC
SW-846 6010	7440-31-5	Tin	82	97	%REC
SW-846 6010	11-09-6	Uranium, Total	88	102	%REC
SW-846 6010	7440-62-2	Vanadium	92	102	%REC
SW-846 6010	7440-66-6	Zinc	85	102	%REC
SW-846 8260	71-55-6	1,1,1-Trichloroethane	57.56	123	%REC
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	57.58	128.8	%REC
SW-846 8260	79-00-5	1,1,2-Trichloroethane	53.6	115.8	%REC
SW-846 8260	75-34-3	1,1-Dichloroethane	55.78	112.3	%REC
SW-846 8260	75-35-4	1,1-Dichloroethene	63.73	138.4	%REC
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	56.09	121.9	%REC
SW-846 8260	95-50-1	1,2-Dichlorobenzene	55.35	114.6	%REC
SW-846 8260	107-06-2	1,2-Dichloroethane	53.24	130	%REC
SW-846 8260	78-87-5	1,2-Dichloropropane	55.71	111.8	%REC
SW-846 8260	106-46-7	1,4-Dichlorobenzene	55.9	114.8	%REC
SW-846 8260	78-93-3	2-Butanone	25.81	113	%REC
SW-846 8260	108-10-1	4-Methyl-2-pentanone	45.21	109.6	%REC
SW-846 8260	67-64-1	Acetone	18.02	114	%REC
SW-846 8260	71-43-2	Benzene	57.86	112.3	%REC
SW-846 8260	75-27-4	Bromodichloromethane	54.44	118	%REC
SW-846 8260	75-25-2	Bromoform	48.88	115.7	%REC
SW-846 8260	74-83-9	Bromomethane	65.32	159.1	%REC
SW-846 8260	75-15-0	Carbon Disulfide	54.95	137.4	%REC
SW-846 8260	56-23-5	Carbon Tetrachloride	58.26	127	%REC
SW-846 8260	108-90-7	Chlorobenzene	57.75	115.8	%REC
SW-846 8260	75-00-3	Chloroethane	60.07	154.2	%REC
SW-846 8260	67-66-3	Chloroform	56.56	117	%REC
SW-846 8260	74-87-3	Chloromethane	53	242.8	%REC
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	55.25	110	%REC
SW-846 8260	124-48-1	Dibromochloromethane	53.89	116.1	%REC
SW-846 8260	100-41-4	Ethylbenzene	61.63	118.4	%REC
SW-846 8260	87-68-3	Hexachlorobutadiene	59.52	127.1	%REC
SW-846 8260	75-09-2	Methylene chloride	58.21	119.2	%REC
SW-846 8260	91-20-3	Naphthalene	53.83	125.6	%REC
SW-846 8260	100-42-5	Styrene	57.9	114.9	%REC
SW-846 8260	127-18-4	Tetrachloroethene	58.4	116.1	%REC

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Test Method	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
SW-846 8260	108-88-3	Toluene	59.79	116.3	%REC
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	57.33	122	%REC
SW-846 8260	79-01-6	Trichloroethene	56.62	108.5	%REC
SW-846 8260	75-01-4	Vinyl chloride	68	214.1	%REC
SW-846 8260	1330-20-7	Xylene	61.17	117.5	%REC

The analytes with potentially unacceptable low recoveries were evaluated in the following manner. If the maximum sample result divided by the lowest LCS recovery for that analyte is less than the WRW AL, no further action is taken because any indicated bias is not great enough to correct a false low sample result to one above the AL. Except for chromium, all results were acceptable. Chromium failed the criteria because of the WRW AL exceedance of 2,600 mg/kg at location CA41-025. The next highest chromium value, 80 mg/kg, passed the criterion indicating LCS bias would not adversely affect project decisions.

In summary, LCS recoveries did not impact project decisions. Any qualification of individual results because of LCS performance exceeding upper or lower tolerance limits is also captured in the V&V flags, described in Section 14.2.3.

Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 13. Surrogate frequency was adequate based on at least one set per sample. The minimum and maximum surrogate results are also tabulated, by chemical, for the entire project. Surrogates are added to every VOC sample, and, therefore, surrogate recoveries only impact individual samples. Unacceptable surrogate recoveries can indicate potential matrix effects. Surrogate recoveries reported above 100 percent may indicate the actual sample results are less than reported. Because this is environmentally conservative, no further action is needed. Therefore, only the lowest recoveries were evaluated. If the maximum sample result divided by the lowest surrogate recovery is less than the WRW AL for that method, no further action is taken because any indicated bias is not great enough to correct a false low sample result to one above the AL.

Table 13
Surrogate Recovery Summary

Number of Samples	CAS No.	Analyte	Minimum Result	Maximum Result	Unit
66	460-00-4	4-Bromofluorobenzene	81	147.1	%REC
66	17060-07-0	Deuterated 1,2-dichloroethane	74	122.9	%REC
66	2037-26-5	Deuterated Toluene	86	122.8	%REC

All IHSS Group 500-2 VOC analyses passed this criterion. Therefore, project decisions were not impacted by VOC surrogate recoveries. Any qualification of results due to surrogate results are also captured in the V&V flags, described in Section 14.2.3.

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Field Blank Evaluation

Results of the field blank analyses are provided in Table 14. Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples. For detections (non-"U" laboratory qualifiers), evaluation consists of multiplying the field blank results by 10 (for laboratory contaminants) or by 5 (for non-laboratory contaminants) and comparing them to the WRW ALs. In this case, to be conservative, the factor used was 10 in all cases. When the corrected field blank result is less than the WRW AL, the associated real results are considered acceptable.

Table 14
Field Blank Summary

Sample QC Code	Laboratory	Analyte	Detected Result	Unit	CAS
TB	URS	Acetone	26	ug/L	67-64-1
TB	URS	2-Butanone	22	ug/L	78-93-3
EB	URS	Uranium-235	0.168	pCi/g	15117-96-1
FB	URS	Uranium-235	0.163	pCi/g	15117-96-1
RNS	URS	Uranium-235	0.155	pCi/g	15117-96-1
EB	URS	Uranium-238	2.58	pCi/g	7440-61-1
FB	URS	Uranium-238	3.33	pCi/g	7440-61-1
RNS	URS	Uranium-238	2.58	pCi/g	7440-61-1

FB = field blank, RNS = equipment rinse, EB = equipment blank, TB = trip blank
µg/L = micrograms per liter

In the IHSS Group 500-2 data, none of the results from blank analyses when multiplied by 10 exceeded their WRW ALs. Therefore, blank contamination did not adversely impact project decisions. Any qualification of results due to field blank results are also captured in the V&V flags, described in Section 14.2.3.

Sample MS Evaluation

Table 15 provides a summary of the minimum and maximum MS results by chemical for the project. According to the EPA data validation guidelines (EPA 1994b), if organic MS recoveries are low, then the LCS recovery should be checked. If the recovery is acceptable, no action is taken. LCS recoveries for organic analyses with potentially unacceptable low MS recoveries were reviewed. For this project, these checks indicate no decisions were impacted for organic analytes with low MS recoveries (refer to previous section).

Table 15
Sample MS Evaluation Summary

Test Method	CAS	Analyte	Minimum Result	Maximum Result	Unit	Number of MS Samples	Number of Lab Batches
SW-846 6010	7429-90-5	Aluminum	652	4890	%REC	8	8
SW-846 6010	7440-36-0	Antimony	39	70	%REC	8	8
SW-846 6010	7440-38-2	Arsenic	89	98	%REC	8	8

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Test Method	CAS	Analyte	Minimum Result	Maximum Result	Unit	Number of MS Samples	Number of Lab Batches
SW-846 6010	7440-39-3	Barium	92	118	%REC	8	8
SW-846 6010	7440-41-7	Beryllium	87	97	%REC	8	8
SW-846 6010	7440-43-9	Cadmium	70	99	%REC	8	8
SW-846 6010	7440-47-3	Chromium	85	225	%REC	8	8
SW-846 6010	7440-48-4	Cobalt	88	99	%REC	8	8
SW-846 6010	7440-50-8	Copper	83	128	%REC	8	8
SW-846 6010	7439-89-6	Iron	0	2340	%REC	8	8
SW-846 6010	7439-92-1	Lead	73	115	%REC	8	8
SW-846 6010	7439-93-2	Lithium	91	114	%REC	8	8
SW-846 6010	7439-96-5	Manganese	33	198	%REC	8	8
SW-846 6010	7439-97-6	Mercury	87	110	%REC	8	8
SW-846 6010	7439-98-7	Molybdenum	86	96	%REC	8	8
SW-846 6010	7440-02-0	Nickel	84	115	%REC	8	8
SW-846 6010	7782-49-2	Selenium	90	98	%REC	8	8
SW-846 6010	7440-22-4	Silver	94	108	%REC	8	8
SW-846 6010	7440-24-6	Strontium	88	106	%REC	8	8
SW-846 6010	7440-31-5	Tin	81	91	%REC	8	8
SW-846 6010	11-09-6	Uranium, Total	86	102	%REC	8	8
SW-846 6010	7440-62-2	Vanadium	81	112	%REC	8	8
SW-846 6010	7440-66-6	Zinc	28	165	%REC	8	8
SW-846 8260	71-55-6	1,1,1-Trichloroethane	73.17	110	%REC	11	11
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	34.76	121	%REC	11	11
SW-846 8260	79-00-5	1,1,2-Trichloroethane	67.99	113.4	%REC	11	11
SW-846 8260	75-34-3	1,1-Dichloroethane	75.34	109	%REC	11	11
SW-846 8260	75-35-4	1,1-Dichloroethene	67.33	109	%REC	11	11
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	27.31	83.27	%REC	11	11
SW-846 8260	95-50-1	1,2-Dichlorobenzene	58.4	102.6	%REC	11	11
SW-846 8260	107-06-2	1,2-Dichloroethane	71.42	126	%REC	11	11
SW-846 8260	78-87-5	1,2-Dichloropropane	71.99	107	%REC	11	11
SW-846 8260	106-46-7	1,4-Dichlorobenzene	59.28	106.7	%REC	11	11
SW-846 8260	78-93-3	2-Butanone	71	218.7	%REC	11	11
SW-846 8260	108-10-1	4-Methyl-2-pentanone	67.57	124	%REC	11	11
SW-846 8260	67-64-1	Acetone	63	338.7	%REC	11	11
SW-846 8260	71-43-2	Benzene	71.14	107	%REC	11	11
SW-846 8260	75-27-4	Bromodichloromethane	71.1	108.3	%REC	11	11
SW-846 8260	75-25-2	Bromoform	69.34	110.1	%REC	11	11
SW-846 8260	74-83-9	Bromomethane	49.99	126	%REC	11	11
SW-846 8260	75-15-0	Carbon Disulfide	72	118.3	%REC	11	11
SW-846 8260	56-23-5	Carbon Tetrachloride	73.7	111	%REC	11	11
SW-846 8260	108-90-7	Chlorobenzene	63.89	110.2	%REC	11	11
SW-846 8260	75-00-3	Chloroethane	53.82	121	%REC	11	11
SW-846 8260	67-66-3	Chloroform	71.29	107	%REC	11	11
SW-846 8260	74-87-3	Chloromethane	43.17	113	%REC	11	11

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Test Method	CAS	Analyte	Minimum Result	Maximum Result	Unit	Number of MS Samples	Number of Lab Batches
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	67.36	107	%REC	11	11
SW-846 8260	124-48-1	Dibromochloromethane	64.95	108.7	%REC	11	11
SW-846 8260	100-41-4	Ethylbenzene	65.82	112.4	%REC	11	11
SW-846 8260	87-68-3	Hexachlorobutadiene	19.3	89.3	%REC	11	11
SW-846 8260	75-09-2	Methylene chloride	65.12	111	%REC	11	11
SW-846 8260	91-20-3	Naphthalene	31.87	85.59	%REC	11	11
SW-846 8260	100-42-5	Styrene	62.97	105.1	%REC	11	11
SW-846 8260	127-18-4	Tetrachloroethene	67.38	101	%REC	11	11
SW-846 8260	108-88-3	Toluene	64.22	109.5	%REC	11	11
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	61.75	105.2	%REC	11	11
SW-846 8260	79-01-6	Trichloroethene	77.75	127.8	%REC	11	11
SW-846 8260	75-01-4	Vinyl chloride	46.78	127	%REC	11	11
SW-846 8260	1330-20-7	Xylene	65.75	113.2	%REC	11	11

For inorganics with MS recoveries greater than zero, the maximum sample results were divided by the lowest percent recovery for each analyte. If the resulting number was less than the WRW AL, decisions were not impacted. Except for chromium, all inorganic results with MS recoveries greater than zero were acceptable based on this criterion. Chromium failed (as expected) because the maximum chromium value, 2,600 mg/kg, was a WRW AL exceedance. The next highest chromium result, 80 mg/kg, passed the criterion.

Iron had a minimum percent recovery of zero. The maximum iron result (44,000 mg/kg at CA42-026, 0.5 to 2.5 ft) is less than 15 percent of the iron WRW AL (307,000 mg/kg). Project decisions were not impacted by the MS percent recovery of 0 for iron.

14.2.2 Precision

Precision is measured by evaluating both MSDs and field duplicates as described in the following sections.

MSD Evaluation

Laboratory precision is measured through the use of MSDs which are summarized in Table 16. Analytes with the highest relative percent differences (RPDs) (greater than 35 percent) are reviewed by comparing the highest sample result to the WRW AL. For analytes with RPDs exceeding 35 percent, if the highest sample results are sufficiently below the ALs, no further action is needed. Aluminum, chromium, iron, manganese, zinc, 1,1,2,2-tetrachloroethane, 2-butanone, and hexachlorobutadiene had maximum RPDs greater than 35 percent. The maximum results for zinc, 1,1,2,2-tetrachloroethane, 2-butanone, and hexachlorobutadiene are equal to or less than 1 percent of their WRW ALs. The maximum aluminum and iron concentrations are less than 15 percent of their WRW ALs and manganese is less than 33 percent of its WRW AL. The maximum chromium concentration from location CA41-025 (2,600 mg/kg) is a WRW AL exceedance and, therefore, fails this criterion (as expected). The next highest chromium result (80 mg/kg) is less than 31 percent of its WRW AL. For this project, this

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review indicates project decisions were not adversely impacted by MSD RPD values greater than 35 percent.

Table 16
Sample MSD Evaluation Summary

Test Method	CAS No.	Analyte	Maximum of RPD (%)
SW-846 6010	7429-90-5	Aluminum	130.843
SW-846 6010	7440-36-0	Antimony	13.636
SW-846 6010	7440-38-2	Arsenic	3.315
SW-846 6010	7440-39-3	Barium	20.561
SW-846 6010	7440-41-7	Beryllium	7.910
SW-846 6010	7440-43-9	Cadmium	8.955
SW-846 6010	7440-47-3	Chromium	82.132
SW-846 6010	7440-48-4	Cobalt	5.348
SW-846 6010	7440-50-8	Copper	13.198
SW-846 6010	7439-89-6	Iron	94.788
SW-846 6010	7439-92-1	Lead	8.187
SW-846 6010	7439-93-2	Lithium	11.364
SW-846 6010	7439-96-5	Manganese	155.556
SW-846 6010	7439-97-6	Mercury	14.634
SW-846 6010	7439-98-7	Molybdenum	3.390
SW-846 6010	7440-02-0	Nickel	23.301
SW-846 6010	7782-49-2	Selenium	3.390
SW-846 6010	7440-22-4	Silver	4.211
SW-846 6010	7440-24-6	Strontium	7.650
SW-846 6010	7440-31-5	Tin	4.706
SW-846 6010	11-09-6	Uranium, Total	4.000
SW-846 6010	7440-62-2	Vanadium	19.608
SW-846 6010	7440-66-6	Zinc	66.295
SW-846 8260	71-55-6	1,1,1-Trichloroethane	17.315
SW-846 8260	79-34-5	1,1,2,2-Tetrachloroethane	55.156
SW-846 8260	79-00-5	1,1,2-Trichloroethane	18.221
SW-846 8260	75-34-3	1,1-Dichloroethane	14.388
SW-846 8260	75-35-4	1,1-Dichloroethene	18.554
SW-846 8260	120-82-1	1,2,4-Trichlorobenzene	21.622
SW-846 8260	95-50-1	1,2-Dichlorobenzene	17.557
SW-846 8260	107-06-2	1,2-Dichloroethane	14.373
SW-846 8260	78-87-5	1,2-Dichloropropane	14.745
SW-846 8260	106-46-7	1,4-Dichlorobenzene	18.396
SW-846 8260	78-93-3	2-Butanone	64.333
SW-846 8260	108-10-1	4-Methyl-2-pentanone	16.243
SW-846 8260	67-64-1	Acetone	34.195
SW-846 8260	71-43-2	Benzene	15.185
SW-846 8260	75-27-4	Bromodichloromethane	14.627
SW-846 8260	75-25-2	Bromoform	16.888

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Test Method	CAS No.	Analyte	Maximum of RPD (%)
SW-846 8260	74-83-9	Bromomethane	34.333
SW-846 8260	75-15-0	Carbon Disulfide	18.020
SW-846 8260	56-23-5	Carbon Tetrachloride	19.274
SW-846 8260	108-90-7	Chlorobenzene	20.687
SW-846 8260	75-00-3	Chloroethane	28.871
SW-846 8260	67-66-3	Chloroform	15.071
SW-846 8260	74-87-3	Chloromethane	14.505
SW-846 8260	10061-01-5	cis-1,3-Dichloropropene	14.125
SW-846 8260	124-48-1	Dibromochloromethane	15.156
SW-846 8260	100-41-4	Ethylbenzene	19.782
SW-846 8260	87-68-3	Hexachlorobutadiene	40.000
SW-846 8260	75-09-2	Methylene chloride	14.142
SW-846 8260	91-20-3	Naphthalene	19.766
SW-846 8260	100-42-5	Styrene	18.321
SW-846 8260	127-18-4	Tetrachloroethene	21.706
SW-846 8260	108-88-3	Toluene	21.137
SW-846 8260	10061-02-6	trans-1,3-Dichloropropene	15.795
SW-846 8260	79-01-6	Trichloroethene	17.285
SW-846 8260	75-01-4	Vinyl chloride	14.894
SW-846 8260	1330-20-7	Xylene	19.735

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. Table 17 indicates that sampling frequencies were adequate.

Table 17
Field Duplicate Sample Frequency Summary

Test Method	Number of Real Samples	Number of Duplicate Samples	% of Duplicate Samples
Alpha Spectroscopy	24	8	33.33%
Gamma Spectroscopy	112	10	8.93%
SW-846 6010	116	10	8.62%
SW-846 6200	4	1	25.00%
SW-846 8260	66	7	10.61%

Duplicate sample RPDs indicate how much variation exists in the field duplicate analyses; duplicate sample RPDs are provided in Table 18. The EPA data validation guidelines state that "there are no required review criteria for field duplicate analyses comparability" (EPA 1994b). For the DQA, the highest maximum RPDs (greater than 35 percent) are normally reviewed. For VOCs all Maximum RPD values were below 35 percent. For metals all URS laboratory RPD results were acceptable. Except for arsenic, all metal RPD results from the ESTLDEN laboratory were greater than 35 percent. However, except for the elevated chromium

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concentration, which was removed during accelerated action activities, metal results did not approach ALs and project decisions were not impacted.

Table 18
RPD Evaluation Summary

Lab Code	Test Method	Analyte	Maximum RPD (%)
ESTLDEN	SW-846 6010	Aluminum	146.82
ESTLDEN	SW-846 6010	Arsenic	6.80
ESTLDEN	SW-846 6010	Barium	83.76
ESTLDEN	SW-846 6010	Beryllium	58.82
ESTLDEN	SW-846 6010	Cadmium	44.83
ESTLDEN	SW-846 6010	Chromium	74.29
ESTLDEN	SW-846 6010	Cobalt	82.35
ESTLDEN	SW-846 6010	Copper	72.25
ESTLDEN	SW-846 6010	Iron	133.33
ESTLDEN	SW-846 6010	Lead	85.71
ESTLDEN	SW-846 6010	Lithium	77.23
ESTLDEN	SW-846 6010	Manganese	109.09
ESTLDEN	SW-846 6010	Mercury	61.68
ESTLDEN	SW-846 6010	Nickel	90.50
ESTLDEN	SW-846 6010	Strontium	118.18
ESTLDEN	SW-846 6010	Vanadium	100.00
ESTLDEN	SW-846 6010	Zinc	64.71
URS	SW-846 6200	Barium	3.37
URS	SW-846 6200	Cobalt	13.62
URS	SW-846 6200	Copper	10.32
URS	SW-846 6200	Iron	5.90
URS	SW-846 6200	Manganese	5.46
URS	SW-846 6200	Nickel	5.35
URS	SW-846 6200	Strontium	2.09
URS	SW-846 6200	Zinc	10.85
ESTLDEN	SW-846 8260	1,1,1-Trichloroethane	4.65
ESTLDEN	SW-846 8260	1,1-Dichloroethane	4.65
ESTLDEN	SW-846 8260	1,2,4-Trichlorobenzene	4.65
ESTLDEN	SW-846 8260	1,2-Dichloroethane	4.65
ESTLDEN	SW-846 8260	4-Methyl-2-pentanone	4.26
ESTLDEN	SW-846 8260	Benzene	4.65
ESTLDEN	SW-846 8260	Bromodichloromethane	4.65
ESTLDEN	SW-846 8260	Bromoform	4.65
ESTLDEN	SW-846 8260	Carbon Disulfide	4.65
ESTLDEN	SW-846 8260	Chlorobenzene	4.65
ESTLDEN	SW-846 8260	Chloroform	4.65
ESTLDEN	SW-846 8260	cis-1,3-Dichloropropene	4.65
ESTLDEN	SW-846 8260	Dibromochloromethane	4.65
ESTLDEN	SW-846 8260	Methylene chloride	4.65

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Lab Code	Test Method	Analyte	Maximum RPD (%)
ESTLDEN	SW-846 8260	Naphthalene	4.65
ESTLDEN	SW-846 8260	Styrene	4.65
ESTLDEN	SW-846 8260	Tetrachloroethene	4.65
ESTLDEN	SW-846 8260	Toluene	4.65
ESTLDEN	SW-846 8260	trans-1,3-Dichloropropene	1.65
ESTLDEN	SW-846 8260	Trichloroethene	4.65

14.2.3 Completeness

Based on original program DQOs, a minimum of 25 percent of ER Program analytical results must be formally validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 19 presents the number and percentage of validated records (codes without "1"), verified records (codes with "1"), and rejected records for each analyte group. The percentage of rejected records was acceptable. The frequency of validation for each of the analytical methods is less than 10% for the project. However, evaluation of overall V&V completeness is based on program statistics that are not evaluated here. Because all results were either validated or verified (as shown in Table 19) and the two rejected results were not considered during remediation deliberations the results are considered adequate for use in project decisions.

Table 19
V&V Summary

Validation Qualifier Code	Total of CAS Number	Alpha Spectroscopy	Gamma Spectroscopy	SW-846 6010	SW-846 6200	SW-846 8260
J	35	10	0	23	0	2
J1	507	0	0	485	4	18
JB1	1	0	0	0	0	1
R1	1	0	0	1	0	0
UJ	20	0	0	16	0	4
UJ1	216	0	0	147	1	68
V	467	0	30	191	0	246
V1	4905	110	306	1805	71	2613
Total	6152	120	336	2668	76	2952
Validated	522	10	30	230	0	252
% Validated	8.49%	8.33%	8.93%	8.62%	0.00%	8.54%
Verified	5630	110	306	2438	76	2700
% Verified	91.51%	91.67%	91.07%	91.38%	100.00%	91.46%
Rejected	1	0	0	1	0	0
% Rejected	0.02%	0.00%	0.00%	0.04%	0.00%	0.00%

KEY: **Validations:** J = Estimated, JB = Estimated with possible laboratory contamination, R = Rejected, UJ = Estimated detection limit, V = Validated **Verifications:** J1 = Estimated, JB1 = Estimated with possible laboratory contamination, R1 = Rejected, UJ1 = Estimated detection limit, V1 = Verified

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14.2.4 Sensitivity

Reporting limits, in units of micrograms per kilogram (µg/kg) for organics, mg/kg for metals, and picocuries per gram (pCi/g) for radionuclides, were compared with the RFCA WRW ALs. Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions. "Adequate" sensitivity is defined as an RL that is less than an analyte's associated AL, typically less than one-half the AL.

14.3 Summary of Data Quality

LCS, surrogate, field blank, MS, MSD, and field duplicate frequency results were acceptable or did not impact project decisions. Real-duplicate RPD maximums for metals were generally high; however, expect for chromium, which was removed, results did not approach ALs and project decisions were not impacted. Only one metal analysis was rejected; however, this did not impact project decisions. The individual exceedance of chromium at location CA41-025 was found to have no impact on final project decisions. Compliance with the project quality requirements and the RFETS V&V goal of 25 percent for all analytical records indicates these data are adequate. Data collected and used for IHSS Group 500-2 are adequate for decision making.

15.0 CONCLUSIONS

Results of the accelerated action justify an NFAA determination for IHSS Group 500-2. This justification is based on the following:

- Soil with chromium concentrations greater than the WRW AL was removed.
- All remaining contaminant concentrations are less than WRW ALs.
- No accelerated action is required based on the SSRS.
- No accelerated action is required based on the stewardship evaluation.

16.0 REFERENCES

CDPHE, 2003, Approval of Industrial Area Sampling and Analysis Plan Addendum #IA-03-07, IHSS Group 500-2, June 6.

CDPHE, 2004, Approval of ER RSOP Notification #04-14, IHSS Group 500-2, April 12.

DOE, 1992-2003, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado.

DOE, 1999, Order 414.1A, Quality Assurance.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

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DOE, 2002a, RFETS Automated Surface Water Monitoring Report, Water Years 1997-2000, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2002b, Final 2001 Annual Rocky Flats Cleanup Agreement (RFCA) Groundwater Monitoring Report for the Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-07, IHSS Group 500-2, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Modification 1, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2003c, Automated Surface Water Monitoring Report, Water Year 2002, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2003d, Second Quarter RFCA Groundwater Monitoring Report for Calendar Year 2003, Rocky Flats Environmental Technology Site, Golden, Colorado, November.

DOE, 2004, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation Notification #04-14, Rocky Flats Environmental Technology Site, Golden, Colorado, July.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 1994a, Guidance for the Data Quality Objective Process, QA/G-4.

EPA, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012.

EPA, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013.

EPA, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis, QA/G-9.

K-H, 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v2, December.

K-H, 2002b, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2.

K-H, 2002c, V&V Guidelines for Volatile Organics, DA-SS01-v2.

K-H, 2002d, V&V Guidelines for Semivolatile Organics, DA-SS02-v3.

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K-H, 2002e, V&V Guidelines for Metals, DA-SS05-v1.

Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

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APPENDIX A
CORRESPONDENCE

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ENVIRONMENTAL RESTORATION
REGULATORY CONTACT RECORD

Date/Time: February 19, 2004

Site Contact(s): Marla Broussard
Phone: 303-966-6007

Regulatory Contact: Harlen Ainscough, Dave Kruchek, Elizabeth Pottorff, Carl Spreng
Phone: 303-692-3300

Agency: CDPHE

Purpose of Contact: Consultative Process Meeting– Meeting Notes

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Discussion:

February 19, 2004 Comment Resolution Meetings
For

IHSS 500-169 NFAA Justification
CRA SAP
Jeb Love Report Sampling
IHSS Group 500-2 Sampling
700 Area Sampling

A meeting was held on February 19, 2004 to discuss the IHSS 500-169 NFAA Justification, CRA SAP, Jeb Love Report sampling, IHSS Group 500-2 sampling, and 700 Area sampling.

I. Attendees

CDPHE: Harlen Ainscough, Dave Kruchek, Elizabeth Pottorff, Carl Spreng
EPA: Gary Kleeman
DOE: Norma Castaneda
K-H: Marcella Broussard
K-H Team: Nick Demos, Susan Serreze

II. Report Status

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Upcoming reports include Pond C-1 NFAA Justification, Draft Closeout Report for IHSS Group 900-1, Draft Closeout Report for IHSS Group 400-8 and Draft Closeout Report for IHSS Group 800-1.

III. Issues

No sitewide issues were discussed.

IV. Specific Comments

IHSS 500-169 NFAA Justification
The following resolutions were agreed to:

1. The large metallic object identified with geophysical instruments will be removed if within 3 feet of the surface as part of IHSS Group 500-1.
2. CDPHE and EPA concurred that IHSS 500-169 was approved as an NFAA.

CRA SAP
The following resolutions were agreed to:

1. CDPHE and EPA will provide comments, if any, and approval on the CRA SAP.

Jeb Love Report Sampling

1. Sampling of "mima mounds" was in accordance with CDPHE and EPA request.
2. CDPHE concurred that NFAA was appropriate for Site #4.
3. CDPHE and EPA will review the data and provide additional comments or NFAA for the other four sites.

IHSS Group 500-2 Sampling
The following resolutions were agreed to:

1. Fill beneath the northern part of former Building 551 will be sampled because the source of the fill is unknown.
2. The first two depth intervals (A and B) will be sampled at two locations in the fill area beneath the northern part and the second two depth intervals (C and D) will be sampled at two locations in the fill area beneath the southern part of the building footprint. A subsequent conversation between Harlen Ainscough and Marla Broussard clarified this approach so that first two depth intervals (A and B) will be sampled at one location in the fill area beneath the northern part of the building footprint and one in the fill area beneath the southern part of the building footprint and the remaining depth intervals will be sampled at one location in the fill area beneath the northern part of the building footprint and one in the fill area beneath the southern part of the building footprint.

700 Area Sampling
The following resolutions were agreed to:

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1. DOE will propose additional sampling locations in the 700 Area.

V. Meetings

The next meeting is scheduled for Thursday, March 4, 2004 at 10:30 AM.

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ER REGULATORY CONTACT RECORD

Date/Time: March 15, 2004/ 1:10

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlan Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Simple sample location moves and clarifications, IHSS Groups 500-2 and 500-5

Discussion
Two locations in IHSS Group 500-2 (IASAP Addendum #IA-03-07) will be moved to avoid obstructions:

- CA42-030 is located under a cargo container in RCRA Unit 18.03. This location will be moved 3 to 5 feet west to get out of the RCRA Unit. This is a biased sample and it will still be located within the previously identified area of the Retention Pond.
- CA42-019 is a statistical location that fell on the fence line for RCRA Unit 18.03. It will be moved 1 to 2 feet west, away from the fence.

For IHSS Group 500-5 (IASAP Addendum #IA-04-03 for IHSS Groups 500-1 and 500-5)

- The dioxin samples will be collected at the A&B intervals at CB43-038 instead of A&B intervals at CB43-037 as stated in Table 3 of the SAP. CB43-038 is where the highest concentrations of Aroclor were observed previously (at 55 ppm).
- The IASAP Addendum states 22 dioxin samples will be collected. However, only 4 dioxin samples are planned as shown in the accompanying Table 4.

(Note added to Contact Record June 21, 2004: The Table 4 referenced here is the Sample Specifications table found in IA SAP Addendum #IA-04-03 for IHSS Groups 500-1 and 500-5. This Table 4 is 38 pages long and for that reason is not included here.)

Contact Record Prepared By: Annette Primrose

Required Distribution:		Additional Distribution:
M. Aguilar, USEPA	R. McCallister, DOE-RFFO	N. Demos
S. Bell, DOE-RFFO	J. Mead, K-H ESS	G. Kelly
J. Berardini, K-H	S. Nesta, K-H RISS	M. Ruthven

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B. Birk, DOE-RFFO	L. Norland, K-H RISS	_____
L. Brooks, K-H ESS	K. North, K-H ESS	_____
M. Broussard, K-H RISS	E. Pottorff, CDPHE	_____
L. Butler, K-H RISS	A. Primrose, K-H RISS	_____
G. Carnival, K-H RISS	R. Schassburger, DOE-RFFO	_____
N. Castaneda, DOE-RFFO	S. Serreze, K-H RISS	_____
C. Deck, K-H Legal	D. Shelton, K-H ESS	_____
S. Gunderson, CDPHE	C. Spreng, CDPHE	_____
M. Keating, K-H RISS	S. Surovchak, DOE-RFFO	_____
G. Kleeman, USEPA	K. Wiemelt, K-H RISS	_____
D. Kruchek, CDPHE	C. Zahm, K-H Legal	_____
D. Mayo, K-H RISS		

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ER REGULATORY CONTACT RECORD

Date/Time: March 16, 2004/ 7:50

Site Contact(s): Mark A. Ruthven
Phone: 303 966-2955

Regulatory Contact: Harlen Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Elimination of VOC samples from 'A' interval due to asphalt removal

Discussion
When the 500-2 SAP Addendum (IA-03-07) was approved, it specified that VOC samples were to be collected in the 'A' interval. These sample specifications were a direct result of the area being covered with asphalt. However, between the approval of the SAP and its execution, the asphalt was removed as part of the D&D of Bldg 551. Since the asphalt has been removed, the need for VOC collection in the 'A' interval was deemed as no longer being valid. Therefore the following modifications to the SAP Addendum were agreed upon and will be addressed in the resulting Closeout or Data Summary Report:

- VOC samples will not be collected in the 'A' interval in areas no longer covered by asphalt.
- Samples were planned for the A & C intervals at locations CA42-033 and CA42-032, the former loading dock locations at B553. Because the loading docks are gone, samples will be collected at the A and B intervals; C intervals were already collected.
- Collection of VOC samples in the 'B' interval will continue according to the SAP.

Contact Record Prepared By: Mark A. Ruthven

Required Distribution:		Additional Distribution:
M. Aguilar, USEPA	R. McCallister, DOE-RFFO	
S. Bell, DOE-RFFO	J. Mead, K-H ESS	
J. Berardini, K-H	S. Nesta, K-H RISS	
B. Birk, DOE-RFFO	L. Norland, K-H RISS	
L. Brooks, K-H ESS	K. North, K-H ESS	
M. Broussard, K-H RISS	E. Pottorff, CDPHE	
L. Butler, K-H RISS	A. Primrose, K-H RISS	
G. Carnival, K-H RISS	R. Schassburger, DOE-RFFO	
N. Castaneda, DOE-RFFO	S. Serreze, K-H RISS	
C. Deck, K-H Legal	D. Shelton, K-H ESS	

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S. Gunderson, CDPHE
M. Keating, K-H RISS
G. Kleeman, USEPA
D. Kruchek, CDPHE
D. Mayo, K-H RISS
C. Spreng, CDPHE
S. Surovchak, DOE-RFFO
K. Wiemelt, K-H RISS
C. Zahm, K-H Legal

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ER REGULATORY CONTACT RECORD

Date/Time: March 17, 2004/ 8:15

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlen Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Use of previous fill material from IHSS 500-2

Discussion
There is a large quantity of fill material associated with Building 551 located within IHSS Group 500-2. In consultation with CDPHE, samples of the fill material were collected on a statistical basis from the fill material within the IHSS group and analyzed for radionuclides, metals and volatile organic compounds.

The results were recently received and are all below wildlife refuge worker action levels. Even though no longer applicable, results are also below the ecological receptor action levels.

Based on this, it was agreed that the material can be used as needed Sitewide for fill material.

Contact Record Prepared By: Annette Primrose

Required Distribution:		Additional Distribution:
M. Aguilar, USEPA	R. McCallister, DOE-RFFO	Harlen Ainscough CDPHE
S. Bell, DOE-RFFO	J. Mead, K-H ESS	Mark Ruthven, KH Team
J. Berardini, K-H	S. Nesta, K-H RISS	
B. Birk, DOE-RFFO	L. Norland, K-H RISS	
L. Brooks, K-H ESS	K. North, K-H ESS	
M. Broussard, K-H RISS	E. Pottorff, CDPHE	
L. Butler, K-H RISS	A. Primrose, K-H RISS	
G. Carnival, K-H RISS	R. Schassburger, DOE-RFFO	
N. Castaneda, DOE-RFFO	S. Serreze, K-H RISS	
C. Deck, K-H Legal	D. Shelton, K-H ESS	
S. Gunderson, CDPHE	C. Spreng, CDPHE	
M. Keating, K-H RISS	S. Surovchak, DOE-RFFO	
G. Kleeman, USEPA	K. Wiemelt, K-H RISS	
D. Kruchek, CDPHE	C. Zahm, K-H Legal	
D. Mayo, K-H RISS		

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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
ER REGULATORY CONTACT RECORD

Date/Time: April 15, 2004 / 10:30 a.m.

Site Contact(s): DOE: Norma Castaneda
K-H: Lee Norland
K-H Team: Mike Anderson, Nick Demos, Susan Serreze

Phone: 303/966-5223

Regulatory Contact: See Attendees below
Phone: 303/692-2035-CDPHE
303/966-4226-DOE

Agency: CDPHE: Elizabeth Pottorff, Carl Spreng, Harlan Ainscough
DOE: Norma Castaneda

Purpose of Contact: Comment Resolution Meeting For Draft IHSS Group 400-4 IASAP Addendum, PCBs, Pond C-1 NFAA Justification, and the ER RSOP Notification for IHSS Group 500-2.

Discussion
See meeting minutes below

Contact Record Prepared By: Susan Serreze

II. Attendees

CDPHE: Harlen Ainscough, Elizabeth Pottorff, Carl Spreng
DOE: Norma Castaneda
K-H: Lee Norland,
K-H Team: Mike Anderson, Nick Demos, Susan Serreze

II. Report Status

The PIC no further action justification and Buffer Zone report were handed out. Upcoming documents include the Draft IHSS Group 600-3 Data Summary.

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V. Issues

No sitewide issues were discussed.

Specific Comments

16.1.1 Draft IASAP Addendum for IHSS Group 400-4

The following resolutions were agreed to:

2. New sampling locations CB38-012 and CA38-025 will replace CA38-024 which was inadvertently dug up while an OPWL was chased.
3. An additional sampling location will be added between the eastern and western ends of PAC 400-803.
4. Efforts will be made to locate photographs of the ingot spill at PAC 400-804 and determine the condition of the road and where on the road the ingots fell. If asphalt patching is present, one sample will be collected in this area. One sample will be collected on the shoulder of the road if photographs indicate where the ingots fell.
5. Efforts will be made to determine the composition of the roof or what type of roofing materials were used in 1972.
6. A statement will be added that indicates that samples will be relocated in the field.
7. The PAC represents an older ditch and current GIS coverages represent a new ditch.

PCBs
16.1.2

The PCB White Paper was briefly discussed and copies of the Transformer IHSS and PAC no further action justifications were handed out. The following resolutions were agreed to:

8. All results for the Transformer sites, except one at depth were less than 10 ppm.
9. The Transformer sites are likely candidates for NFAA, but a blanket statement referencing the PCB White Paper will be included in the HRR.

Pond C-1 NFAA Justification

The depth of sediment in Pond C-1 was discussed and copies of field notes were provided. CDPHE expressed concern that sampling was not adequate at Pond C-1. The following resolutions were agreed to:

10. EPA concurred that sampling at Pond C-1 was sufficient.
11. DOE will revise the Pond C-1 NFAA Justification to address EPA's written comments.

ER RSOP Notification for IHSS Group 500-2

The following resolutions were agreed to:

Confirmation samples will be collected in the sidewalls of the excavation, but no additional sampling is required in the bottom of the excavation because the 0.5- to 2.5-foot interval was sampled and the soil was analyzed at an offsite laboratory.

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V. Meetings

The next meeting is scheduled for Thursday, April 29, 2004 at 10:30 AM.

Required Distribution:		Additional Distribution:
M. Aguilar, USEPA	R. McCallister, DOE-RFFO	H. Ainscough, CDPHE
S. Bell, DOE-RFFO	J. Mead, K-H ESS	J. Walstrom, K-H RISS
J. Berardini, K-H	S. Nesta, K-H RISS	N. Demos, K-H RISS
B. Birk, DOE-RFFO	L. Norland, K-H RISS	M. Anderson, K-H RISS
L. Brooks, K-H ESS	K. North, K-H ESS	
L. Butler, K-H RISS	E. Pottorff, CDPHE	
G. Carnival, K-H RISS	A. Primrose, K-H RISS	
N. Castaneda, DOE-RFFO	R. Schassburger, DOE-RFFO	
C. Deck, K-H Legal	S. Serreze, K-H RISS	
S. Gunderson, CDPHE	D. Shelton, K-H ESS	
M. Keating, K-H RISS	C. Spreng, CDPHE	
D. Kruchek, CDPHE	S. Surovchak, DOE-RFFO	
D. Mayo, K-H RISS	K. Wiemelt, K-H RISS	
S. Garcia, USEPA	C. Zahm, K-H Legal	
	L. Kimmel, USEPA	

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ER REGULATORY CONTACT RECORD

Date/Time: April 26, 2004/1:15

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlen Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Confirmation sampling at 500-2

Discussion
At the area in IHSS Group 500-2 where chromium above action levels is present, an area approximately 3 feet by 3 feet by 6 inches deep will be excavated as described in the RSOP Notification #04-14. Confirmation samples will be collected from the side walls at the approximate midpoint of each side, from the full 6 inch depth of the excavation. These samples will be analyzed offsite for metals to determine if the remedial action is complete.

A confirmation sample in the center at the excavation depth of 6 inches is not required as this increment was covered by the initial sampling at this location.

Contact Record Prepared By: Annette Primrose

Required Distribution:		Additional Distribution:
M. Aguilar, USEPA	R. McCallister, DOE-RFFO	Harlen Ainscough CDPHE
S. Bell, DOE-RFFO	J. Mead, K-H ESS	Mark Ruthven, KH Team
J. Berardini, K-H	S. Nesta, K-H RISS	Dan Reeder, KH Team
B. Birk, DOE-RFFO	L. Norland, K-H RISS	_____
L. Brooks, K-H ESS	K. North, K-H ESS	_____
M. Broussard, K-H RISS	E. Pottorff, CDPHE	_____
L. Butler, K-H RISS	A. Primrose, K-H RISS	_____
G. Carnival, K-H RISS	R. Schassburger, DOE-RFFO	_____
N. Castaneda, DOE-RFFO	S. Serreze, K-H RISS	_____
C. Deck, K-H Legal	D. Shelton, K-H ESS	_____
S. Gunderson, CDPHE	C. Spreng, CDPHE	_____
M. Keating, K-H RISS	S. Surovchak, DOE-RFFO	_____
G. Kleeman, USEPA	K. Wiemelt, K-H RISS	_____
D. Kruchek, CDPHE	C. Zahm, K-H Legal	_____

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D. Mayo, K-H RISS

ER REGULATORY CONTACT RECORD

Date/Time: May 6, 2004/11:00

Site Contact(s): Annette Primrose
Phone: 303 966-4385

Regulatory Contact: Harlan Ainscough
Phone: 303 692-3337

Agency: CDPHE

Purpose of Contact: Backfill of 500-2 excavation

Discussion
All four of the confirmation samples collected for the remedial action at 500-2 were well below action levels. The highest concentration of was chrome was 47 mg/kg, well below the chromium action level of 268 mg/kg. This value is within the range of the other chromium values for this IHSS group and is similar to the surface background value of 16.99 mg/kg and the subsurface background value of 68 mg/kg. Based on this, the excavation will be backfilled.

Contact Record Prepared By: Annette Primrose

Required Distribution:		Additional Distribution:
M. Aguilar, USEPA	R. McCallister, DOE-RFFO	D. Reeder, K-H RISS
S. Bell, DOE-RFFO	J. Mead, K-H ESS	
J. Berardini, K-H	S. Nesta, K-H RISS	
B. Birk, DOE-RFFO	L. Norland, K-H RISS	
L. Brooks, K-H ESS	K. North, K-H ESS	
L. Butler, K-H RISS	E. Pottorff, CDPHE	
G. Carnival, K-H RISS	A. Primrose, K-H RISS	
N. Castaneda, DOE-RFFO	R. Schassburger, DOE-RFFO	
C. Deck, K-H Legal	S. Serreze, K-H RISS	
S. Gunderson, CDPHE	D. Shelton, K-H ESS	
M. Keating, K-H RISS	C. Spreng, CDPHE	
G. Kleeman, USEPA	S. Surovchak, DOE-RFFO	
D. Kruchek, CDPHE	K. Wiemelt, K-H RISS	
D. Mayo, K-H RISS	C. Zahm, K-H Legal	

APPENDIX B
PROJECT PHOTOGRAPHS

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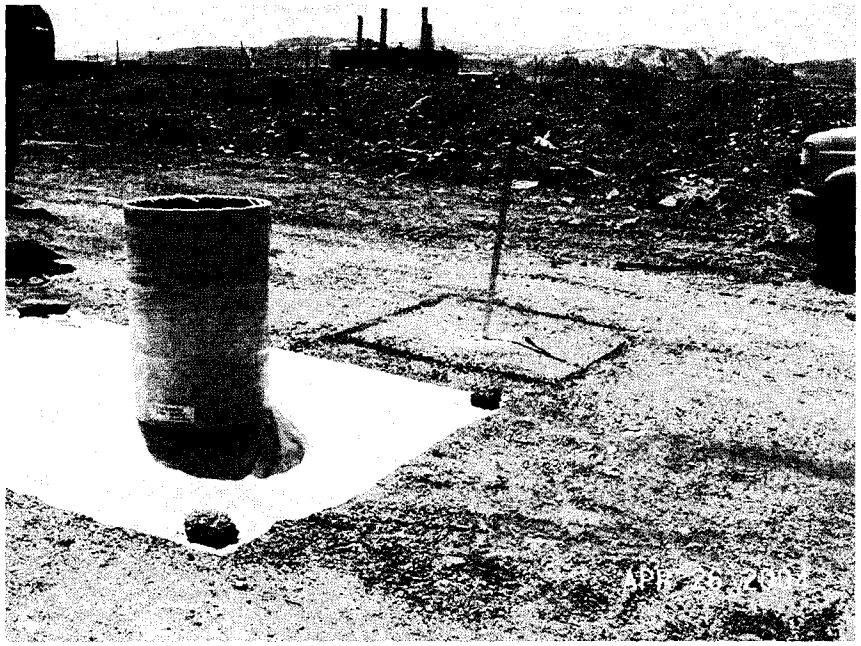
APPENDIX B
PROJECT PHOTOGRAPHS

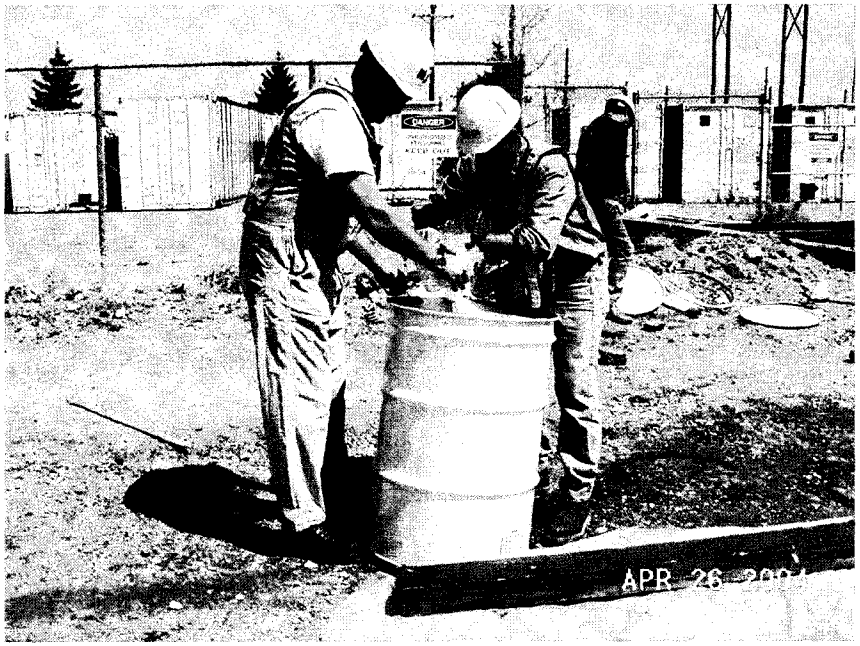


IHSS Group 500-2, Pre-start at location CA41-025

IHSS Group 500-2, Start of digging at location CA41-025

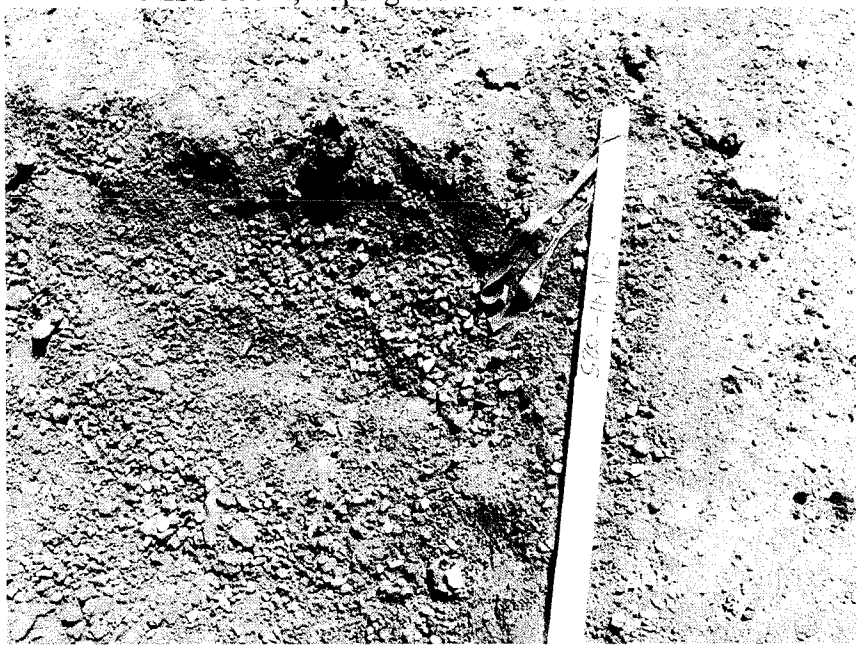
IHSS Group 500-2, digging at location CA41-025

IHSS Group 500-2, drumming soil at location CA41-025

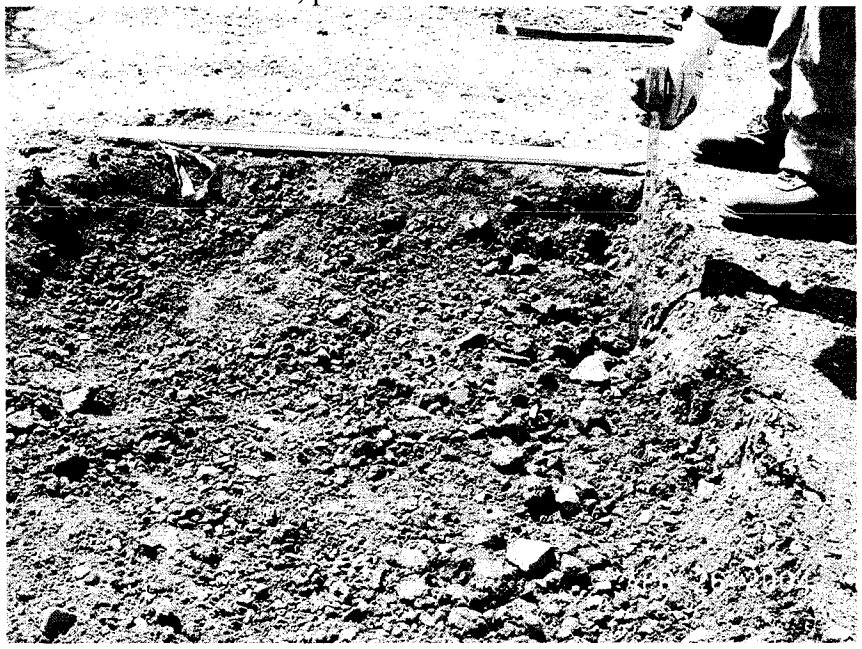


IHSS 500-2, Taping drum liner at CA41-025

IHSS 500-2, partial excavation at CA41-025



IHSS 500-2, partial excavation at CA41-025



IHSS Group 500-2, excavation at CA41-025

COMPACT DISC
ACCELERATED ACTION DATA

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79

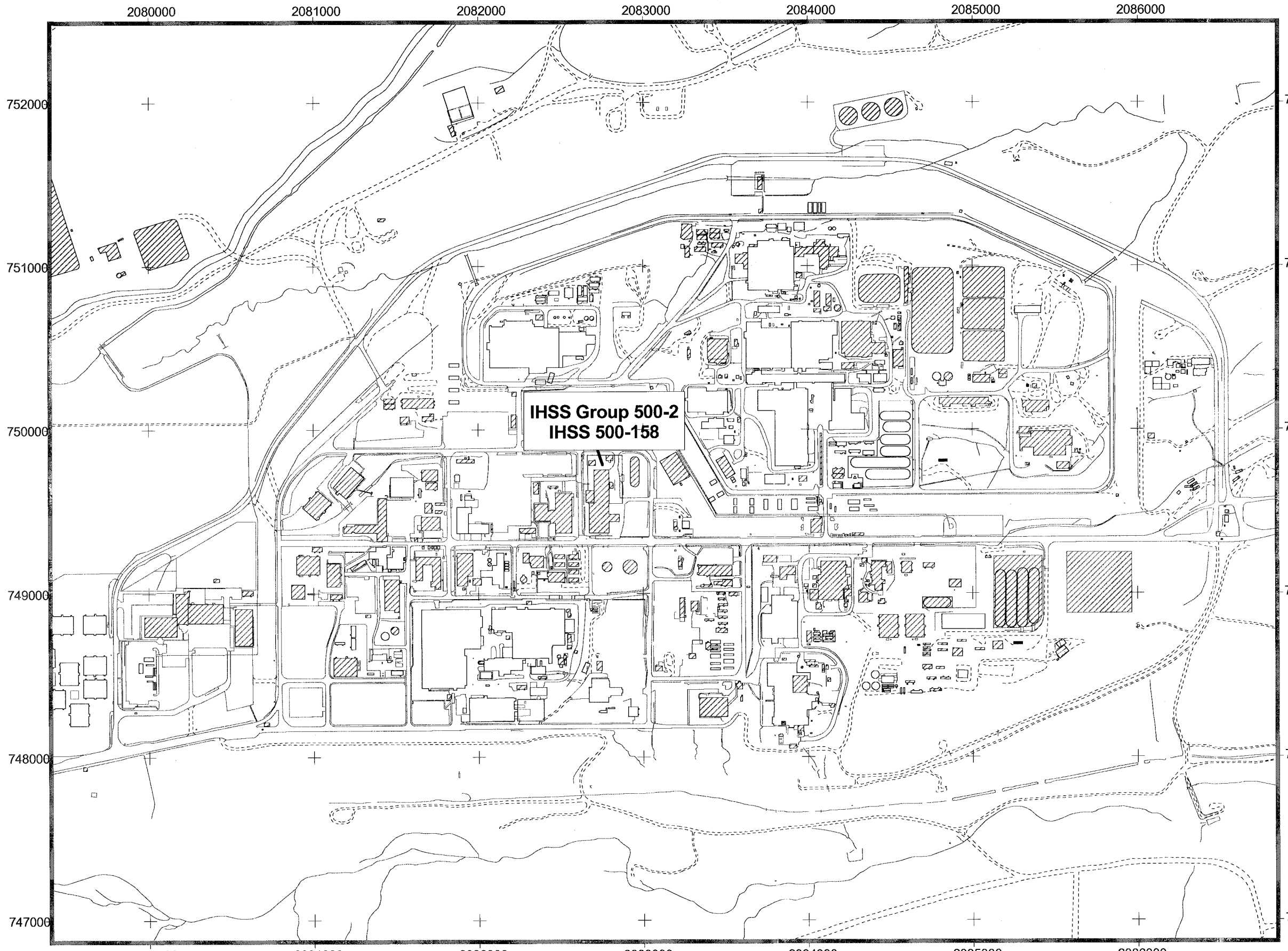

FIGURE 1

IHSS Group 500-2
General Location

KEY

- IHSS 500-158
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

N
W E
S

250 0 250 500 750 Feet

Scale = 1: 7500

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared for: KAISER•HILL COMPANY

Prepared by: RADMS

File: W:\Projects\Fy2004\500-2\
Closeout\500-2_clsout_dcr.apr Date: 6/16/04

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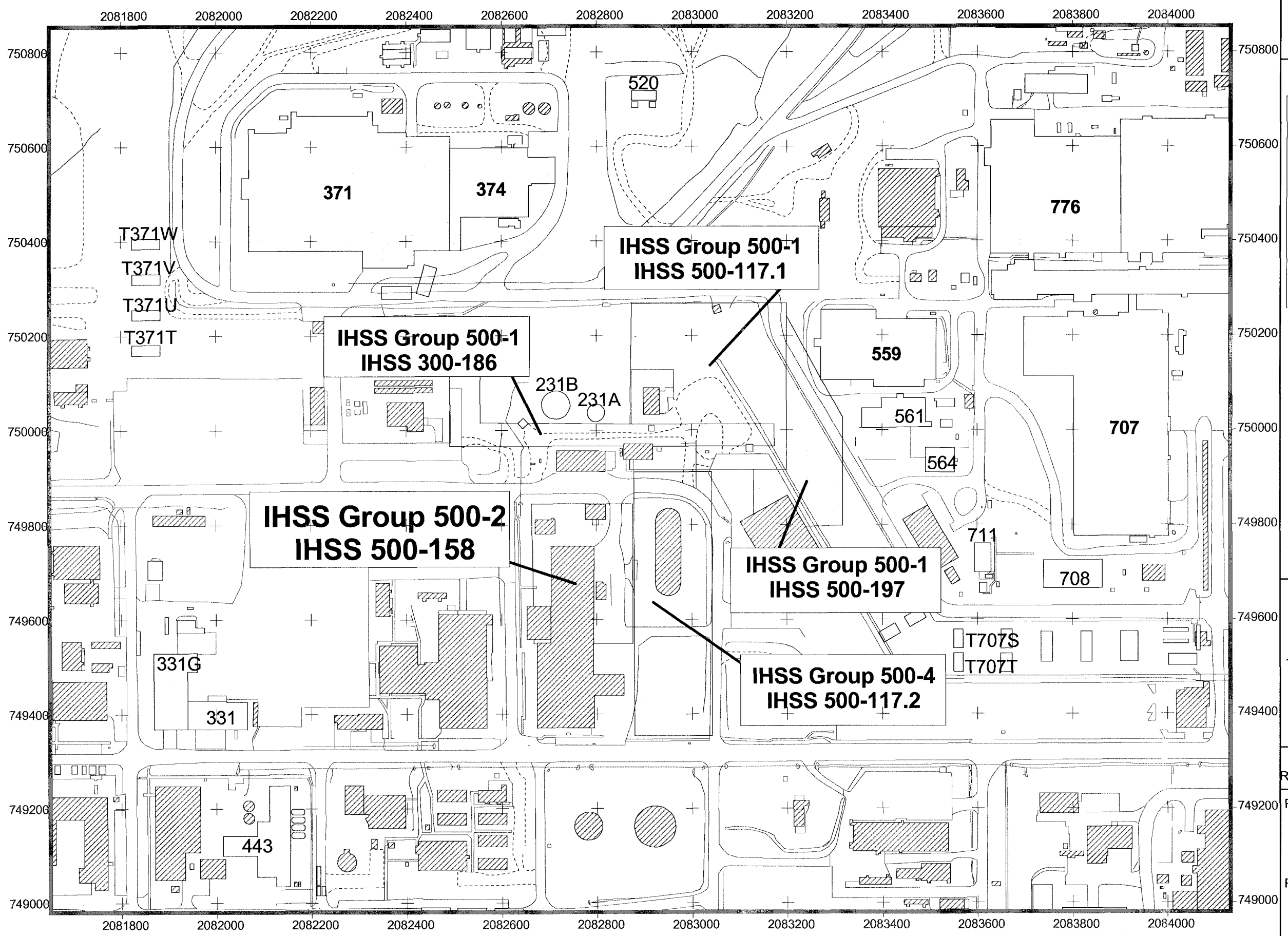
FIGURE 2
IHSS Group 500-2
Detailed Location



KEY

- IHSS
- Overlapping IHSS
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

N
W E
S

100 0 100 200 300 Feet

Scale = 1: 3000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

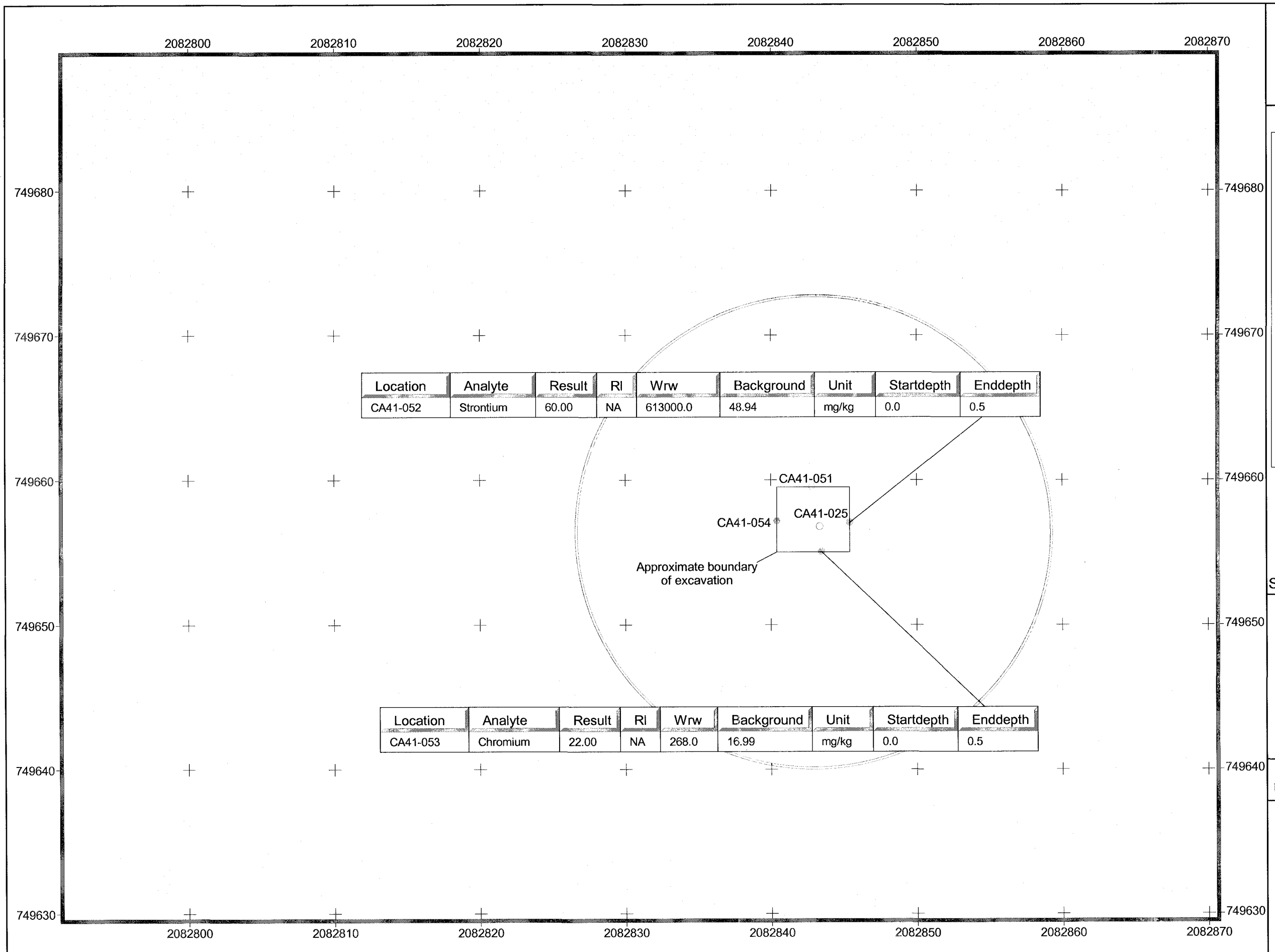
Prepared for: KAISER•HILL COMPANY

Prepared by: RADMS

File: W:\Projects\Fy2004\500-2\
Closeout\500-2_clsout_dcr.apr

Date: 6/16/04

FIGURE 5
IHSS Group 500-2
Confirmation Sampling
Locations and Results
Near Location CA41-025



Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-052	Strontium	60.00	NA	613000.0	48.94	mg/kg	0.0	0.5

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-053	Chromium	22.00	NA	268.0	16.99	mg/kg	0.0	0.5

KEY

- Characterization sampling location with concentration greater than background and greater than WRW AL
- Confirmation sampling location with concentration greater than background and less than WRW AL
- Confirmation sampling location with concnetration less than background and less than WRW AL
- IHSS 500-158
- Remediation area from Figure 4

Start depth and End depth are in feet.

N
W E
S

2.5 0 2.5 5 7.5 10 Feet

Scale = 1: 80

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: KAISER•HILL COMPANY

Prepared for: RADMS

File: W:\Projects\Fy2004\500-2\
Closeout\500-2_clsout_dcr.apr Date: 6/16/04

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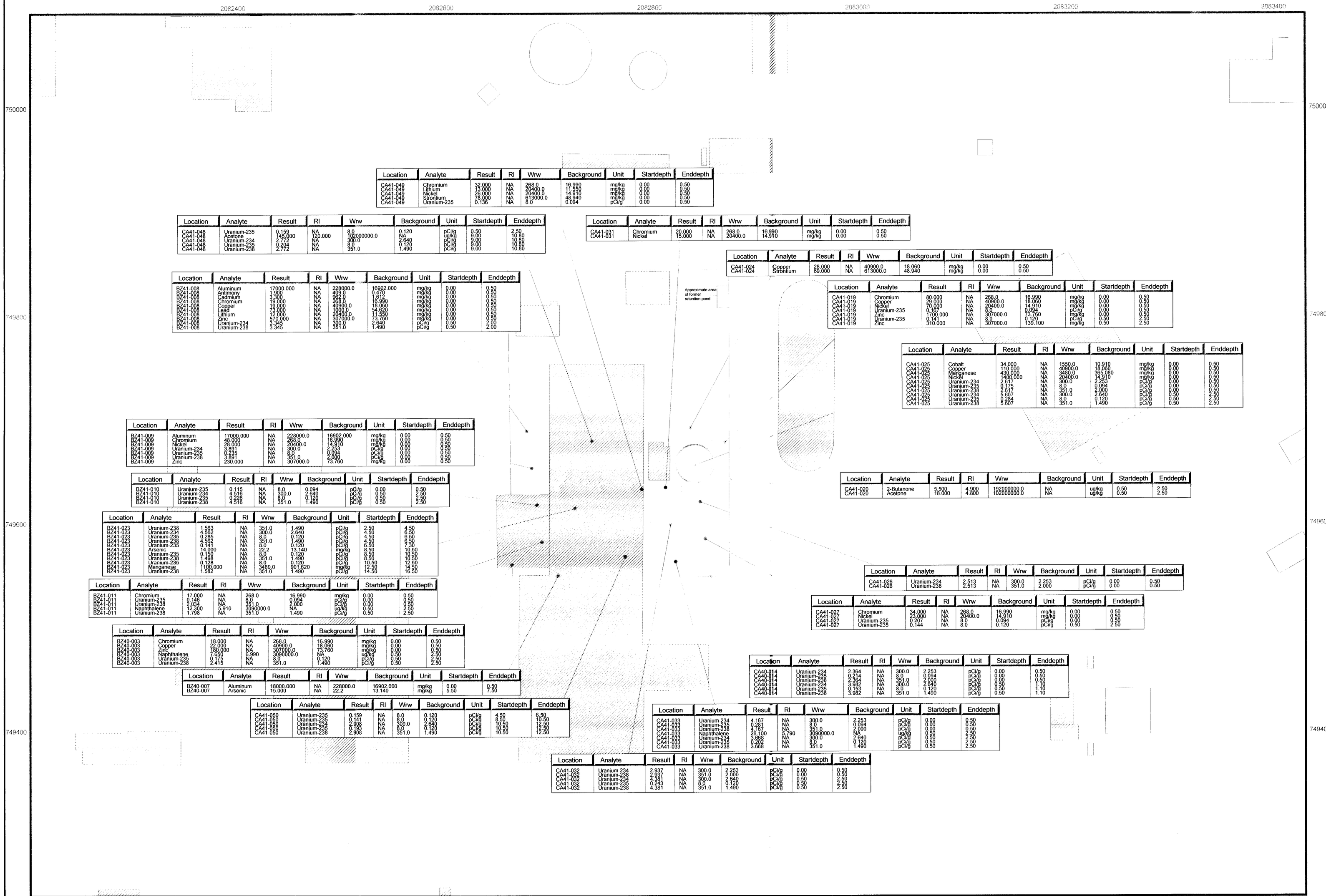
FIGURE 4

IHSS Group 500-2
Accelerated Action Surface and Subsurface
Soil Sampling Results
Greater than Background Means
Plus Two Standard Deviations
or Reporting Limits
(Southern Half)



Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-049	Chromium	32.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-049	Lithium	13.000	NA	20400.0	11.550	mg/kg	0.00	0.50
CA41-049	Nickel	28.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-049	Strontium	78.000	NA	613000.0	48.940	mg/kg	0.00	0.50
CA41-049	Uranium-235	0.136	NA	8.0	0.094	pCi/g	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-048	Uranium-235	0.159	NA	8.0	0.120	pCi/g	0.50	2.50
CA41-048	Acetone	145.000	120.000	NA	NA	ug/kg	0.00	10.80
CA41-048	Uranium-234	2.772	NA	300.0	2.640	pCi/g	0.00	10.80
CA41-048	Uranium-235	0.204	NA	8.0	0.120	pCi/g	0.00	10.80
CA41-048	Uranium-238	2.772	NA	351.0	1.490	pCi/g	0.00	10.80

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-031	Chromium	20.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-031	Nickel	15.000	NA	20400.0	14.910	mg/kg	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-024	Copper	28.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA41-024	Strontium	89.000	NA	613000.0	48.940	mg/kg	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-008	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ41-008	Antimony	1.900	NA	409.0	0.470	mg/kg	0.00	0.50
BZ41-008	Cadmium	3.300	NA	962.0	1.612	mg/kg	0.00	0.50
BZ41-008	Chromium	19.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ41-008	Copper	19.000	NA	40900.0	18.060	mg/kg	0.00	0.50
BZ41-008	Lead	73.000	NA	1000.0	54.620	mg/kg	0.00	0.50
BZ41-008	Lithium	12.000	NA	20400.0	11.550	mg/kg	0.00	0.50
BZ41-008	Zinc	570.000	NA	307000.0	73.760	mg/kg	0.00	0.50
BZ41-008	Uranium-234	3.345	NA	300.0	2.640	pCi/g	0.50	2.00
BZ41-008	Uranium-238	3.345	NA	351.0	1.490	pCi/g	0.50	2.00

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-019	Chromium	80.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-019	Copper	29.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA41-019	Nickel	70.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-019	Uranium-235	0.167	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-019	Zinc	1700.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA41-019	Uranium-235	0.141	NA	8.0	0.120	pCi/g	0.50	2.50
CA41-019	Zinc	310.000	NA	307000.0	136.100	mg/kg	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-025	Cobalt	34.000	NA	1550.0	10.910	mg/kg	0.00	0.50
CA41-025	Copper	110.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA41-025	Manganese	430.000	NA	3480.0	365.080	mg/kg	0.00	0.50
CA41-025	Nickel	1400.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-025	Uranium-234	2.612	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-025	Uranium-235	0.173	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-025	Uranium-238	2.617	NA	351.0	2.000	pCi/g	0.00	0.50
CA41-025	Uranium-234	2.907	NA	300.0	2.640	pCi/g	0.50	2.50
CA41-025	Uranium-235	0.284	NA	8.0	0.120	pCi/g	0.50	2.50
CA41-025	Uranium-238	2.907	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-009	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ41-009	Chromium	48.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ41-009	Nickel	28.000	NA	20400.0	14.910	mg/kg	0.00	0.50
BZ41-009	Uranium-234	3.891	NA	300.0	2.253	pCi/g	0.00	0.50
BZ41-009	Uranium-235	0.235	NA	8.0	0.094	pCi/g	0.00	0.50
BZ41-009	Uranium-238	3.891	NA	351.0	2.000	pCi/g	0.00	0.50
BZ41-009	Zinc	230.000	NA	307000.0	73.760	mg/kg	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-010	Uranium-235	0.115	NA	8.0	0.094	pCi/g	0.00	0.50
BZ41-010	Uranium-234	4.516	NA	300.0	2.640	pCi/g	0.50	2.50
BZ41-010	Uranium-235	0.226	NA	8.0	0.120	pCi/g	0.50	2.50
BZ41-010	Uranium-238	4.516	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-023	Uranium-238	1.563	NA	351.0	1.490	pCi/g	2.50	4.50
BZ41-023	Uranium-234	4.582	NA	300.0	2.640	pCi/g	4.50	6.50
BZ41-023	Uranium-235	0.265	NA	8.0	0.120	pCi/g	4.50	6.50
BZ41-023	Uranium-238	4.741	NA	351.0	1.490	pCi/g	4.50	6.50
BZ41-023	Arsenic	14.000	NA	22.2	7.140	mg/kg	8.50	10.50
BZ41-023	Uranium-235	0.150	NA	8.0	0.120	pCi/g	8.50	10.50
BZ41-023	Uranium-238	1.490	NA	351.0	1.490	pCi/g	8.50	10.50
BZ41-023	Uranium-235	0.128	NA	8.0	0.120	pCi/g	10.50	12.50
BZ41-023	Manganese	1100.000	NA	3480.0	901.620	mg/kg	12.50	14.50
BZ41-023	Uranium-238	1.582	NA	351.0	1.490	pCi/g	14.50	16.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-011	Chromium	17.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ41-011	Uranium-235	0.146	NA	8.0	0.094	pCi/g	0.00	0.50
BZ41-011	Uranium-238	2.034	NA	351.0	2.000	pCi/g	0.00	0.50
BZ41-011	Naphthalene	12.300	5.910	3090000.0	NA	ug/kg	0.50	2.50
BZ41-011	Uranium-238	1.798	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ40-003	Chromium	18.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ40-003	Copper	22.000	NA	40900.0	18.060	mg/kg	0.00	0.50
BZ40-003	Zinc	186.000	NA	307000.0	73.760	mg/kg	0.00	0.50
BZ40-003	Naphthalene	7.650	6.990	3090000.0	NA	ug/kg	0.50	2.50
BZ40-003	Uranium-235	0.172	NA	8.0	0.120	pCi/g	0.50	2.50
BZ40-003	Uranium-238	2.415	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ40-007	Aluminum	18000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ40-007	Arsenic	15.000	NA	22.2	13.140	mg/kg	5.50	7.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-050	Uranium-235	0.159	NA	8.0	0.120	pCi/g	4.50	6.50
CA41-050	Uranium-235	0.141	NA	8.0	0.120	pCi/g	6.50	10.50
CA41-050	Uranium-234	2.906	NA	300.0	2.640	pCi/g	10.50	12.50
CA41-050	Uranium-235	0.193	NA	8.0	0.120	pCi/g	10.50	12.50
CA41 050	Uranium-238	2.908	NA	351.0	1.490	pCi/g	10.50	12.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-020	2-Butanone	5.500	4.900	192000000.0	NA	ug/kg	0.50	2.50
CA41-020	Acetone	18.000	4.800	102000000.0	NA	ug/kg	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-026	Uranium-234	2.513	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-026	Uranium-238	2.513	NA	351.0	2.000	pCi/g	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-027	Chromium	34.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-027	Nickel	23.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-027	Uranium-235	0.207	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-027	Uranium-235	0.144	NA	8.0	0.120	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-014	Uranium-234	2.364	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-014	Uranium-235	0.164	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-014	Uranium-234	3.982	NA	300.0	2.640	pCi/g	0.50	1.10
CA41-014	Uranium-235	0.153	NA	8.0	0.120	pCi/g	0.50	1.10
CA41-014	Uranium-238	3.982	NA	351.0	1.490	pCi/g	0.50	1.10

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-033	Uranium-234	4.167	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-033	Uranium-235	0.281	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-033	Uranium-238	4.167	NA	351.0	2.000	pCi/g	0.00	0.50
CA41-033	Naphthalene	28.100	5.790	3090000.0	NA	ug/kg	0.50	2.50
CA41-033	Uranium-234	3.668	NA	300.0	2.640	pCi/g	0.50	2.50
CA41-033	Uranium-235	0.202	NA	8.0	0.120	pCi/g	0.50	2.50
CA41-033	Uranium-238	3.668	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-032	Uranium-234	2.937	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-032	Uranium-235	0.181	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-032	Uranium-234	4.361	NA	300.0	2.640	pCi/g	0.50	2.50
CA41-032	Uranium-235	0.243	NA	8.0	0.120	pCi/g	0.50	2.50
CA41-032	Uranium-238	4.361	NA	351.0	1.490	pCi/g	0.50	2.50

KEY

- Characterization sampling location with concentration greater than Background and greater than WRW AL
- Confirmation sampling location with concentration greater than Background and less than WRW AL
- Remediation area Figure 5
- IHSS 500-158
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

Start depth and End depth are measured in feet.

N
W E
S

Scale = 1: 600

50 0 50 100 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared for: KAISER•HILL COMPANY

Prepared by: RADMS

File: W:\Projects\Fy2004\500-2\Closeout\500-2_clsout_dcr.apr

Date: 6/16/04

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750200 750000 749800 749600 749400

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-033	Aluminum	19000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
CA42-033	Beryllium	1.100	NA	921.0	0.966	mg/kg	0.00	0.50
CA42-033	Chromium	19.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA42-033	Copper	21.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA42-033	Iron	22000.000	NA	307000.0	18037.000	mg/kg	0.00	0.50
CA42-033	Lithium	12.000	NA	20400.0	11.550	mg/kg	0.00	0.50
CA42-033	Nickel	16.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA42-033	Uranium-235	0.133	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-033	Vanadium	47.000	NA	7150.0	45.590	mg/kg	0.00	0.50
CA42-033	Zinc	76.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA42-033	Uranium-235	0.165	NA	8.0	0.120	pCi/g	2.50	4.50
CA42-033	Uranium-238	2.516	NA	351.0	1.490	pCi/g	2.50	4.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-027	Antimony	0.600	NA	409.0	0.470	mg/kg	0.00	0.50
CA42-027	Strontium	73.000	NA	613000.0	48.940	mg/kg	0.00	0.50
CA42-027	Uranium-235	0.169	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-027	Uranium-235	0.145	NA	8.0	0.120	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-026	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
CA42-026	Chromium	26.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA42-026	Nickel	19.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA42-026	Uranium-235	0.159	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-026	Copper	310.000	NA	40900.0	38.210	mg/kg	0.50	2.50
CA42-026	Iron	44000.000	NA	307000.0	41046.520	mg/kg	0.50	2.50
CA42-026	Uranium-235	0.130	NA	8.0	0.120	pCi/g	0.50	2.50
CA42-026	Uranium-238	1.585	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-032	Aluminum	19000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
CA42-032	Chromium	18.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA42-032	Nickel	16.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA42-032	Uranium-235	0.161	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-032	Zinc	140.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA42-032	Uranium-235	0.142	NA	8.0	0.120	pCi/g	0.50	2.50
CA42-032	Uranium-235	0.140	NA	8.0	0.120	pCi/g	2.50	4.50
CA42-032	Uranium-238	1.642	NA	351.0	1.490	pCi/g	2.50	4.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-019	Chromium	31.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA42-019	Copper	19.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA42-019	Nickel	20.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA42-019	Uranium-235	0.139	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-019	Zinc	82.000	NA	307000.0	73.760	mg/kg	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-015	Uranium-235	0.174	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-015	Uranium-234	3.655	NA	300.0	2.540	pCi/g	0.50	1.60
CA42-015	Uranium-235	0.166	NA	8.0	0.120	pCi/g	0.50	1.60
CA42-015	Uranium-238	3.655	NA	351.0	1.490	pCi/g	0.50	1.60

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-030	Zinc	230.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA42-030	Lead	26.000	NA	1000.0	24.970	mg/kg	0.50	2.50
CA42-030	Tetrachloroethene	5.500	1.100	615000.0	NA	ug/kg	0.50	2.50
CA42-030	Tetrachloroethene	5.600	1.100	615000.0	NA	ug/kg	2.50	4.50
CA42-030	Zinc	150.000	NA	307000.0	139.100	mg/kg	2.50	4.50
CA42-030	Tetrachloroethene	1.200	1.100	615000.0	NA	ug/kg	4.50	6.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-031	Zinc	150.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA42-031	Acetone	7.900	5.100	102000000.0	NA	ug/kg	0.50	1.50
CA42-031	Tetrachloroethene	3.200	1.100	615000.0	NA	ug/kg	0.50	1.50
CA42-031	Acetone	7.400	5.700	102000000.0	NA	ug/kg	2.50	4.50
CA42-031	Uranium-235	0.431	NA	8.0	0.120	pCi/g	2.50	4.50
CA42-031	Acetone	9.200	5.700	102000000.0	NA	ug/kg	6.50	8.50
CA42-031	Acetone	7.500	5.800	102000000.0	NA	ug/kg	8.50	9.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-016	Copper	24.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA42-016	Iron	19000.000	NA	307000.0	18037.000	mg/kg	0.00	0.50
CA42-016	Manganese	420.000	NA	3480.0	365.080	mg/kg	0.00	0.50
CA42-016	Uranium-235	0.123	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-016	Uranium-235	0.146	NA	8.0	0.120	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-024	Acetone	7.200	5.400	102000000.0	NA	ug/kg	0.50	1.80
CA42-024	Tetrachloroethene	1.200	1.200	615000.0	NA	ug/kg	0.50	1.80

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA42-020	Copper	31.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA42-020	Iron	23000.000	NA	307000.0	18037.000	mg/kg	0.00	0.50
CA42-020	Manganese	490.000	NA	3480.0	365.080	mg/kg	0.00	0.50
CA42-020	Uranium-235	0.129	NA	8.0	0.094	pCi/g	0.00	0.50
CA42-020	Zinc	92.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA42-020	Uranium-235	0.155	NA	8.0	0.120	pCi/g	0.50	1.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-017	Chromium	26.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-017	Nickel	18.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-017	Zinc	160.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA41-017	Uranium-235	0.138	NA	8.0	0.120	pCi/g	0.50	1.50
CA41-017	Uranium-238	1.794	NA	351.0	1.490	pCi/g	0.50	1.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-018	Chromium	17.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-018	Nickel	16.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-018	Zinc	500.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA41-018	Uranium-235	0.710	NA	8.0	0.120	pCi/g	0.50	1.50
CA41-018	Uranium-238	1.518	NA	351.0	1.490	pCi/g	0.50	1.50
CA41-018	Zinc	330.000	NA	307000.0	139.100	mg/kg	0.50	1.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-023	Copper	28.000	NA	40900.0	18.060	mg/kg	0.00	0.50
CA41-023	Iron	22000.000	NA	307000.0	18037.000	mg/kg	0.00	0.50
CA41-023	Manganese	530.000	NA	3480.0	365.080	mg/kg	0.00	0.50
CA41-023	Uranium-234	4.495	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-023	Uranium-235	0.191	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-023	Uranium-238	4.462	NA	351.0	2.000	pCi/g	0.00	0.50
CA41-023	Zinc	86.000	NA	307000.0	73.760	mg/kg	0.00	0.50
CA41-023	Uranium-234	4.208	NA	300.0	2.640	pCi/g	0.50	1.20
CA41-023	Uranium-235	0.222	NA	8.0	0.120	pCi/g	0.50	1.20
CA41-023	Uranium-238	4.208	NA	351.0	1.490	pCi/g	0.50	1.20

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-028	Uranium-234	4.132	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-028	Uranium-235	0.244	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-028	Uranium-238	4.132	NA	351.0	2.000	pCi/g	0.00	0.50
CA41-028	Uranium-234	2.639	NA	300.0	2.640	pCi/g	0.50	1.50
CA41-028	Uranium-235	0.193	NA	8.0	0.120	pCi/g	0.50	1.50
CA41-028	Uranium-238	2.639	NA	351.0	1.490	pCi/g	0.50	1.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-029	Chromium	24.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-029	Cobalt	12.000	NA	1580.0	10.910	mg/kg	0.00	0.50
CA41-029	Nickel	15.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-029	Uranium-234	4.246	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-029	Uranium-235	0.234	NA	8.0	0.094	pCi/g	0.00	0.50
CA41-029	Uranium-238	4.246	NA	351.0	2.000	pCi/g	0.00	0.50
CA41-029	Uranium-234	6.393	NA	300.0	2.640	pCi/g	0.50	2.50
CA41-029	Uranium-238	6.397	NA	351.0	1.490	pCi/g	0.50	2.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-001-01	Strontium	70.000	NA	613000.0	48.940	mg/kg	0.00	0.50
BZ42-001-01	Acetone	30.000	5.200	102000000.0	NA	ug/kg	0.50	2.00
BZ42-001-01	Tetrachloroethene	2.700	1.100	615000.0	NA	ug/kg	0.50	2.00

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-002-01	Lithium	12.000	NA	20400.0	11.550	mg/kg	0.00	0.50
BZ42-002-01	Strontium	72.000	NA	613000.0	48.940	mg/kg	0.00	0.50
BZ42-002-01	Plutonium-239/240	0.072	NA	50.0	0.020	pCi/g	0.50	1.00
BZ42-002-01	Uranium-235	0.206	NA	8.0	0.120	pCi/g	0.50	1.00

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-005-01	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ42-005-01	Chromium	17.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ42-005-01	Uranium-235	0.116	NA	8.0	0.094	pCi/g	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-009	Aluminum	18000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ42-009	Uranium-235	0.156	NA	8.0	0.094	pCi/g	0.00	0.50
BZ42-009	Naphthalene	7.710	5.450	3090000.0	NA	ug/kg	0.50	2.00

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-006	Aluminum	21000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ41-006	Chromium	17.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ41-006	Lithium	12.000	NA	20400.0	11.550	mg/kg	0.00	0.50
BZ41-006	Nickel	17.000	NA	20400.0	14.910	mg/kg	0.00	0.50
BZ41-006	Uranium-234	25.000	NA	300.0	24.970	pCi/g	0.50	2.00
BZ41-006	Uranium-235	0.337	NA	8.0	0.120	pCi/g	0.50	2.00
BZ41-006	Uranium-238	3.132	NA	351.0	1.490	pCi/g	0.50	2.00

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ41-007	Plutonium-239/240	0.106	NA	50.0	0.066	pCi/g	0.00	0.50
BZ41-007	Zinc	110.000	NA	307000.0	73.760	mg/kg	0.00	0.50
BZ41-007	Lead	32.000	NA	1000.0	24.970	mg/kg	0.50	1.50
BZ41-007	Tetrachloroethene	1.300	1.100	615000.0	NA	ug/kg	0.50	1.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
BZ42-003-01	Aluminum	32000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
BZ42-003-01	Barium	300.000	NA	26400.0	141.260	mg/kg	0.00	0.50
BZ42-003-01	Beryllium	1.300	NA	921.0	0.966	mg/kg	0.00	0.50
BZ42-003-01	Chromium	27.000	NA	268.0	16.990	mg/kg	0.00	0.50
BZ42-003-01	Copper	19.000	NA	40900.0	18.060	mg/kg	0.00	0.50
BZ42-003-01	Iron	22000.000	NA	307000.0	18037.000	mg/kg	0.00	0.50
BZ42-003-01	Lithium	18.000	NA	20400.0	11.550	mg/kg	0.00	0.50
BZ42-003-01	Nickel	18.000	NA	20400.0	14.910	mg/kg	0.00	0.50
BZ42-003-01	Uranium-235	0.181	NA	8.0	0.094	pCi/g	0.00	0.50
BZ42-003-01	Vanadium	49.000	NA	7150.0	45.590	mg/kg	0.00	0.50
BZ42-003-01	Arsenic	14.900	NA	22.7	13.140	mg/kg	0.50	1.00
BZ42-003-01	Uranium-235	0.153	NA	8.0	0.120	pCi/g	0.50	1.00

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-047	Aluminum	22000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
CA41-047	Beryllium	1.000	NA	921.0	0.966	mg/kg	0.00	0.50
CA41-047	Chromium	20.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-047	Lithium	14.000	NA	20400.0	11.550	mg/kg	0.00	0.50
CA41-047	Uranium-234	3.448	NA	300.0	2.253	pCi/g	0.00	0.50
CA41-047	Uranium-238	3.448	NA	351.0	2.000	pCi/g	0.00	0.50

Location	Analyte	Result	RI	Wrw	Background	Unit	Startdepth	Enddepth
CA41-034	Aluminum	25000.000	NA	228000.0	16902.000	mg/kg	0.00	0.50
CA41-034	Beryllium	1.700	NA	921.0	0.966	mg/kg	0.00	0.50
CA41-034	Chromium	24.000	NA	268.0	16.990	mg/kg	0.00	0.50
CA41-034	Iron	20000.000	NA	307000.0	18037.000	mg/kg	0.00	0.50
CA41-034	Lithium	16.000	NA	20400.0	11.550	mg/kg	0.00	0.50
CA41-034	Nickel	17.000	NA	20400.0	14.910	mg/kg	0.00	0.50
CA41-034	Vanadium	46.000	NA	7150.0	45.590	mg/kg	0.00	0.50
CA41-034	Acetone	12.000	5.600	102000000.0	NA	ug/kg	0.50	2.50

Approximate area of former retention pond

FIGURE 3

IHSS Group 500-2
Accelerated Action Surface and Subsurface Soil Sampling Results
Greater than Background Means Plus Two Standard Deviations or Reporting Limits
(Northern Half)

KEY

- Sampling location with concentration greater than Background and less than WRW AL
- IHSS 500-158
- Demolished building
- Standing building
- Paved road
- Dirt road
- Surface water drainage

Start dpeth and End depth are measured in feet.

N
W E
S

Scale = 1: 600

50 0 50 100 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared for:

KAISER•HILL COMPANY

Prepared by:

RADMS

File: W:\Projects\Fy2004\500-2\Closeout\500-2_clsout_dcr.apr

Date: 6/16/04

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